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ABSTRACT

SUPERSTARS III is a K-8 program designed as an enrichment opportunity for self-directed learners in mathematics. The basic purpose of SUPERSTARS III is to provide the extra challenge that self-motivated students need in mathematics and to do so in a structured, long-term program that does not impinge on the normal classroom routine or the instructor's time. The program involves teachers, administrators, assisting adult volunteers, and parents in the learning process. Assisting adults devote a few hours each week to operate the system effectively in the school while an administrator provides visible support through coordinating the program in the schools. The levels of the program are named for the planets in the solar system. This packet contains materials for Kindergarten (Mercury), first grade (Venus), and second grade (Earth). Materials within each grade are organized into two sections. Section I contains general information about the program and variations on the basic model, information/checklist for principals, information checklist for assisting adults, information for teachers, and letters to participating students and their parents. Section II is comprised of the student worksheets and adult volunteer commentary for student worksheets. (PVD)

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SUPERSTARS III

K - 2

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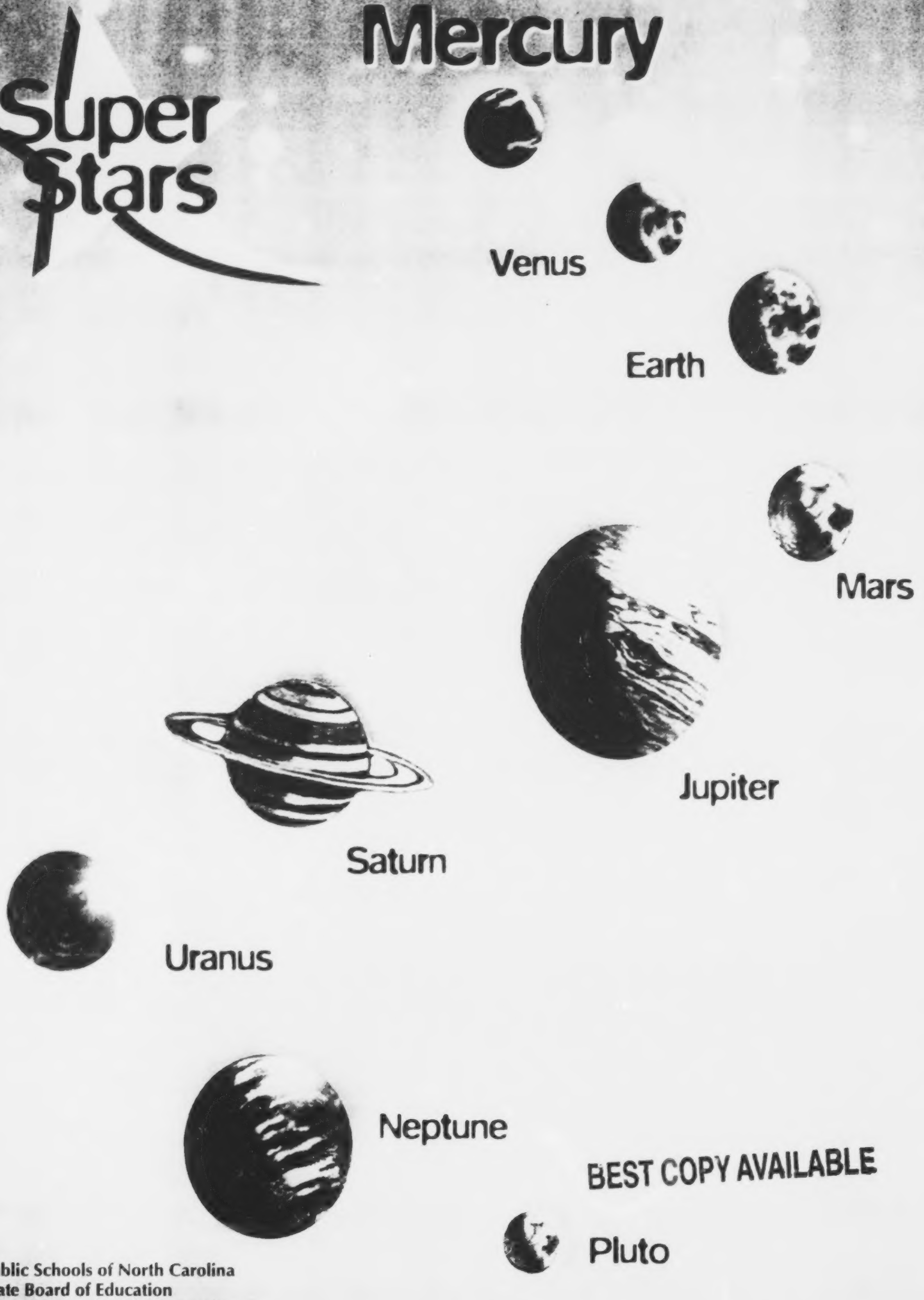
Super Stars


Mercury
Venus
Earth
Mars
Jupiter
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Neptune
Pluto

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Public Schools of North Carolina
State Board of Education
Department of Public Instruction
Division of Instructional Services

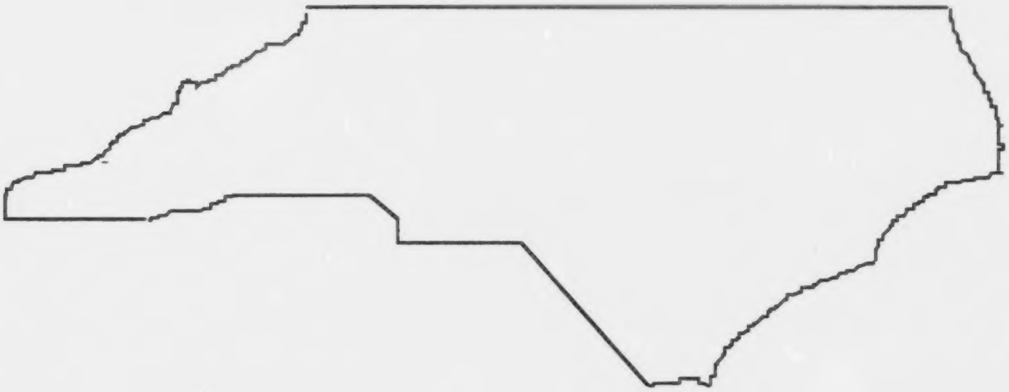
Published March 1998

☆ ACKNOWLEDGMENTS ☆

This project, originally designated ***Sunshine Math,*** is the third in a series of problem solving programs. It was conceived, coordinated and developed through the Florida Department of Education with input from the mathematics staff members of the North Carolina Department of Public Instruction and the South Carolina Department of Education. In addition, it was supported financially through a grant to the School Board of Polk County, Florida. The rich history of these materials and the predecessor programs, **SUPERSTARS** and **SUPERSTARS II** goes back to the early 1980's. Many Florida teachers have been involved in developing and using these materials over the years. The original **SUPERSTARS** programs were adopted and adapted by North Carolina and South Carolina with their teachers contributing to revisions and personalizations for use in their states. Florida educators were primarily responsible for developing, field testing, and publishing ***Sunshine Math.*** Educators from the Carolinas developed the **MathStars Newsletter** to accompany and enhance this program.

School districts in North Carolina have permission to reproduce this document for use in their schools for non-profit educational purposes. Copies of each grade level are available from the publications unit of the North Carolina Department of Public Instruction. The contact for **SUPERSTARS III** and the **MathStars Newsletter** is Linda Patch, 301 North Wilmington Street, Raleigh, NC 27601-2825 : (919-715-2225).

Michael E. Ward
State Superintendent
North Carolina Department of Public Instruction



★ *Preface* ★

SUPERSTARS III encourages and enhances the positive aspects of students, parents, teachers and administrators working together. This program assumes that students, even young children, are capable of and interested in learning; that teachers want to help them learn to think for themselves; that administrators see their jobs as clearing the path so that quality education is delivered effectively in their schools; and that parents care about their child's learning and are willing to work with the school system toward that goal. Each of these four groups has a vital role to play in implementing **SUPERSTARS III.**

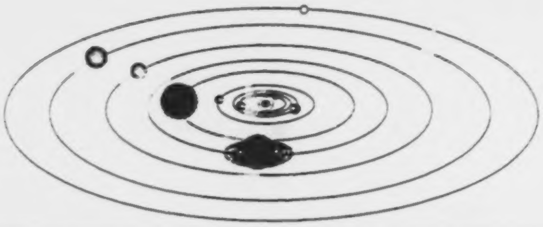
The designer of this program has a long history of working with elementary children. He believes that they are capable of much more than we ask of them, and that many children are on the path to becoming independent learners. A number of children in any classroom are bright, energetic and willing to accept extra challenges.

The basic purpose of **SUPERSTARS III** is to provide the extra challenge that self-motivated students need in mathematics, and to do so in a structured, long-term program that does not impinge on the normal classroom routine or the time of the teacher. The system is not meant to replace any aspect of the school curriculum -- it is offered as a peripheral opportunity for students who identify with challenges and who want to be rewarded for their extra effort. Participation in the program is always optional -- only those students who voluntarily choose to participate will, in the long run, benefit from **SUPERSTARS III**. Any student, regardless of prior academic performance, should be encouraged to participate as long as interest is maintained.

The predecessor program for **SUPERSTARS III** -- the **SUPERSTARS II** program -- has demonstrated that this concept can be extremely useful. What is required are several dedicated adults who devote a few hours each week to operate the system effectively in the school; an administrator who provides highly visible support; teachers who welcome a supplementary experience for their students to engage in higher-order thinking; and a typical classroom of students. If all of those ingredients are present **SUPERSTARS III** will become an integral part of the school fabric.

SUPERSTARS III: General Information

SUPERSTARS III is a K-8 program designed as an enrichment opportunity for self-directed learners in mathematics. The levels of the program are named for the planets in our solar system:



Kindergarten	Mercury	Fourth Grade	Jupiter
First Grade	Venus	Fifth Grade	Saturn
Second Grade	Earth	Sixth Grade	Uranus
Third Grade	Mars	Seventh Grade	Neptune
	Eighth Grade	Pluto	

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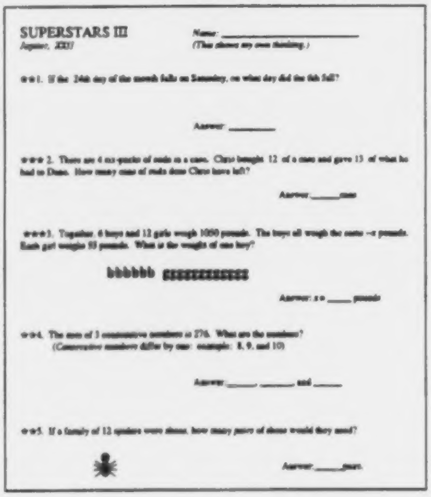
ORGANIZATION OF THESE MATERIALS

Section I Description of the **SUPERSTARS III** Program

1. General Information
2. Information/checklist for principals
3. Information/checklist for assisting adults
4. Information for teachers
5. Letter to participating students and their parents.

Section II Student worksheets for **SUPERSTARS III**



SUPERSTARS III

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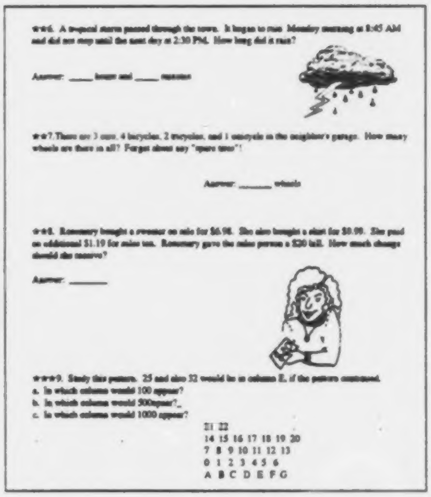
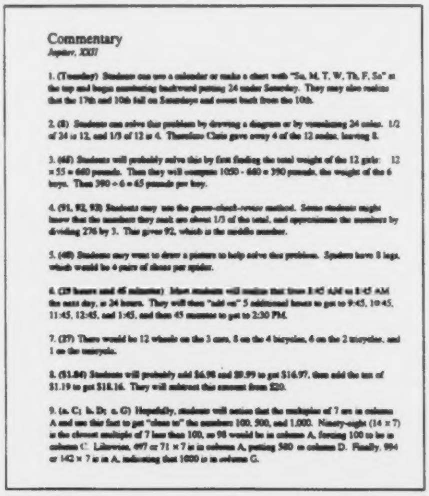


Section III Commentary for student worksheets for **SUPERSTARS III**
(Note: Kindergarten materials do not have commentaries)



Commentary

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SUPERSTARS III: General Information

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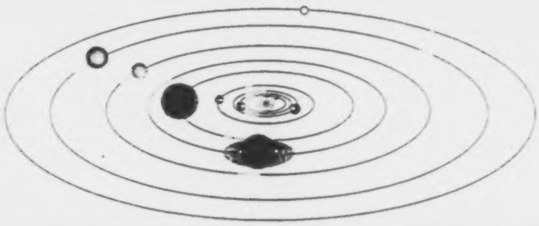


Kindergarten	Mercury	Fourth Grade	Jupiter
First Grade	Venus	Fifth Grade	Saturn
Second Grade	Earth	Sixth Grade	Uranus
Third Grade	Mars	Seventh Grade	Neptune
	Eighth Grade	Pluto	

Students of all ability levels choose on their own to participate in **SUPERSTARS III**. Seeing their names displayed in a prominent place in the school, with a string of stars indicating their success, is one reward students receive for their extra work. In some cases the school may decide to enhance this basic system by awarding certificates of achievement or some other form of recognition to highlight certain levels of success or participation in the **SUPERSTARS III** program.

SUPERSTARS III can function in a school in a number of different ways. A "tried and true" way is for assisting adults (volunteers, aides, etc.) to manage the program for the entire school, with support provided by school administrators and classroom teachers. This system has been adopted at the school level, with varying degrees of success, over the years. The basic model for conducting **SUPERSTARS III** is discussed below, with variations described on the next page.

The basic model

The basic model for **SUPERSTARS III** is for a school to establish a weekly cycle at the beginning of the academic year according to the following guidelines:

On Monday of each week student worksheets are distributed by the assisting adults to students in the program. Students have until Friday to complete the problems working entirely on their own. On Friday the classroom teacher holds a brief problem-solving session for the students in the program. The more difficult problems on the worksheet are discussed with students describing their thinking about strategies to solve the problems. They do not share solutions, only strategies.

Students receive double credit for those problems they have successfully completed prior to the problem-solving session, and regular credit for those they complete successfully over the week-end. On Monday all papers are handed in, checked by the assisting adult, and stars are posted for problems successfully completed. This completes one cycle of the **SUPERSTARS III** program.

SUPERSTARS III is not for every child -- it is only for those who are self-motivated and who are not easily frustrated by challenging situations. This does not diminish the value of the program, but rather makes us realize that there are children of all ability and socio-economic levels who are self-directed learners and who need challenges beyond those of the regular school day. These children will shine in **SUPERSTARS III.**

Variations of the basic model

The first variation that has been used successfully retains the weekly cycle and assisting adult role from the basic model. The teacher however, involves the entire class in the problem-solving discussions. For example, the teacher might select the four most difficult problems on the worksheet (indicated by three or four stars) and work a "parallel" problem with the entire class to open the mathematics lesson on Tuesday through Friday. Using this variation, all students are exposed to the problem-solving strategies, but only those who have chosen to participate in **SUPERSTARS III** will complete and turn in the worksheet on Monday.

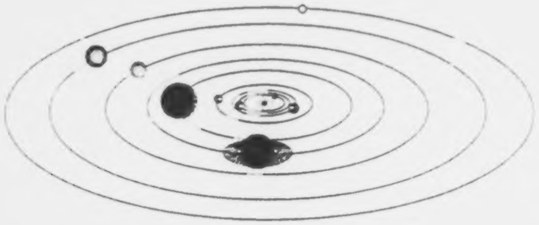
A second variation has the assisting adult manage the entire program, including the Friday problem-solving session . This method has been used in situations where teachers lacked commitment to the program and thus implemented it inconsistently. In such cases, the assisting adult must have a progressive view of what constitutes problem solving in elementary mathematics. They should also receive extra assistance from the administration to ensure that students are released from class and that the cycles proceed smoothly.

Yet another variation is for a parent to manage **SUPERSTARS III** at home for his or her own child. The basic rules are the same -- a child gets the worksheet once a week and time to work the problems alone. The parent sets a night to listen to the way the child thought about each problem, offering suggestions or strategies only when the child is unable to proceed. The reward system is basically the same, stars on a chart, but can be enhanced by doing something special with the child, such as a trip to the museum or to a sporting event when the child reaches certain levels of success. If this method is adopted, the parent must not try to teach the child, but rather to stimulate discussion of problem-solving strategies. **SUPERSTARS III** is not a program for adults to teach children how to think.

Other variations exist. The basic model as stated is the best, all other factors being equal, for reaching more children in a consistent fashion than any of the other methods. However, we encourage individual schools, teachers, or parents to get some version started; some starlight is better than none.

SUPERSTARS III: Information for Principals

SUPERSTARS III is a K-8 enrichment package for mathematics designed to be managed by volunteer assisting adults with coordinated support from the classroom teacher and school administrators. The purpose of the program is to give self-motivated students of all ability levels a chance to extend themselves beyond the standard mathematics curriculum. The complete set of materials comes in nine packages, one for each grade K-8. The grade levels are identified by the names of the nine planets in our solar system and their order from the sun:



Mercury - Kindergarten
Venus - First Grade
Earth - Second Grade
Mars - Third Grade
Jupiter - Fourth Grade
Saturn - Fifth Grade
Uranus - Sixth Grade
Neptune - Seventh Grade
Pluto - Eighth Grade.

Your support is vital if this program is to succeed. As the school administrator, you need to stay in close contact with the **SUPERSTARS III** program. A "checklist for success" follows:

☐ Become familiar with the philosophy and component parts of the program.

☐ Introduce **SUPERSTARS III** to the faculty early in the school year. Ensure that teachers understand the philosophy of the program and have copies of the student worksheets and commentaries appropriate for their grade levels.

☐ Speak to parents at your school's first open house of the year, explaining the purpose of **SUPERSTARS III** and the long term value of children working independently on challenging problems.

☐ Recruit several assisting adults (PTA members, aides, senior citizens, business partners, church members, etc.) who are enthusiastic, dependable people who are willing to manage the program. Early in the academic year, meet with these assisting adults to plan such details as:

✓ A prominent place and format for the STAR CHART.

✓ A designated time and place each Monday and Friday for the assisting adults to be in school to meet with students, distribute and collect worksheets, and post stars.

✓ A system for the activity sheets to be duplicated each week.

✓ A plan for extra incentives for accumulating stars. ("World records" to be kept from year-to-year, a celebration day planned for the end of school, prizes earned by students for attaining certain levels of success -- see the diagram below for examples.)

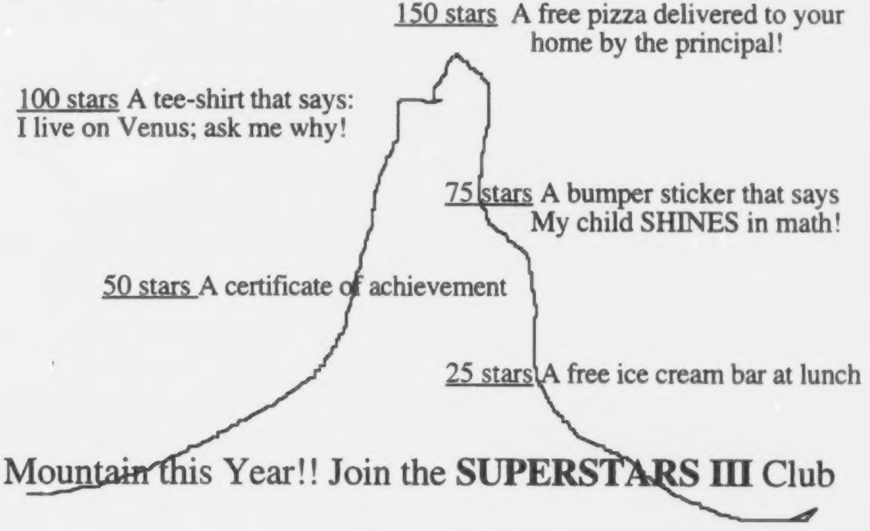
✓ A schedule for the initiation of the program and a decision as to a "start over" point later in the academic year. Review the school calendar and only use weeks that are at least four days long. If there is not enough time in the year to complete all the activity sheets, decide which to eliminate or on a plan to "double up."

✓ A **SUPERSTARS III** cap, name badge, tee-shirt, or other distinction for volunteers, if possible.

☐ Monitor the program every two weeks to get ahead of unforeseen difficulties. Administrators need to be highly visible and supportive for **SUPERSTARS** to succeed.

SUPERSTARS III is an optional program for students. It should be available to any student who wants to participate, regardless of prior success in mathematics. Typically, a large number of students will begin the program, but a majority will lose interest. A significant number however, will continue their efforts over the life of the program. This is normal and simply means that **SUPERSTARS III** is successfully addressing the needs of the self-directed learner.

Visual reminders help children see this mathematics program is challenging and rewarding. Some ideas are presented here:



150 stars A free pizza delivered to your home by the principal!

100 stars A tee-shirt that says: I live on Venus; ask me why!

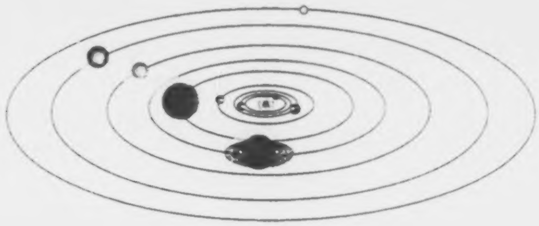
75 stars A bumper sticker that says My child SHINES in math!

50 stars A certificate of achievement

25 stars A free ice cream bar at lunch

Climb the Mountain this Year!! Join the **SUPERSTARS III** Club

SUPERSTARS III: Information for Assisting Adults



SUPERSTARS III is designed to give assisting adults a well-defined role to play in the school's mathematics program. The success of **SUPERSTARS III** depends upon a team effort among teachers, administrators, parents and you. Reliability and punctuality are important - students will quickly come to depend upon you to be there as scheduled, to check their papers and post their stars, and to listen to alternate strategies and interpretations of problems to help them arrive at solutions. If possible, wear an outfit or badge that fits with the **SUPERSTARS III** theme or logo; students will soon identify you as an important person in their school.

* * * * * *

SUPERSTARS III works on a weekly cycle. Each Monday you will collect the worksheets from the previous week and distribute new worksheets to the participating students, all from your **SUPERSTARS III** area of the school. Allow students to see the answers to the problems, discuss any for which their answers differ and allow them credit if their interpretation and reasoning are sound. After checking all the work, you will post the stars earned by students on the STAR CHART.

* * * *

Participating students have from Monday until Friday to work the problems entirely on their own -- the only help they should receive during that time is for someone to read the problems to them. On Friday the teacher will host a problem-solving session in the classroom where students will describe the strategies they used to approach the more difficult problems. Students who have successfully completed problems before this session will receive double points for their efforts. The teacher's initials on the worksheet will help you identify those problems. The students then have the week-end to complete or correct their problems and turn them in on Monday. All the correct problems thus completed will receive the indicated number of stars.

* * * * *

Be creative when designing your STAR CHART. The basic method of posting stars individually is a good way to begin but eventually you will want a more efficient system. Color coding by grade level, or posting just one star each week with a number in its center are ideas to consider. You may wish to personalize the chart and the entire **SUPERSTARS III** center with student pictures, "smiling faces", a logo, seasonal theme or some other feature that has a mathematical flavor. Occasionally feature a reward for each child such as a cookie or a hand stamp in the shape of a star just for turning in the worksheet. You are helping enthusiastic students develop high-level thinking skills -- be creative and enjoy your role!

Checklist for assisting adults:

☐ Plan the following with the principal:

✓ A prominent place and format for the

☆STAR CHART☆

✓ The time and place for you to collect, check, and distribute worksheets.

✓ A system for duplicating worksheets each week which ensures legible copies. Also a secure storage area for masters and other materials.

✓ Any additional incentives ("world records," stickers, coupons, pencils, tee-shirts, etc.) that will be part of the system for rewarding levels of achievement in **SUPERSTARS III**.

☆

☐ Make the **SUPERSTARS III** center a happy place. Use bright colors, smiles, and cheerful expressions. Show confidence, friendliness, and encouragement to students.

☆ ☆ ☆

☐ Collect the letters that are sent home prior to the first worksheet. These need to be signed by each student and a parent. If, in the future, you have evidence that the work submitted does not represent the thinking of the student, discuss the situation with the classroom teacher. These situations are best handled individually, confidentially and in a firm, consistent manner.

* * *

☐ Check the worksheets from the previous week uniformly. If you give partial credit for a problem with several parts do so in a fair way that can be understood by the students. Do not award partial credit for problems with only one answer.

* * *

☐ Have answer sheets available and encourage students to look at the solutions when they submit their worksheets. Allow them to explain their strategy or interpretation if they have arrived at a different answer. Award full credit if they show a unique and plausible interpretation of a problem and follow sound logic in arriving at their response.

* * *

☐ Leave extra worksheets with the classroom teacher for participating students who were absent on Monday. Accept a late-arriving worksheet only if the student was absent on Monday. If a student's name is missing or in the wrong place on the worksheet, check the paper but award stars to "No Name" on the STAR CHART. Adhering strictly to these rules will rapidly teach responsibility to the students and keep your work manageable.

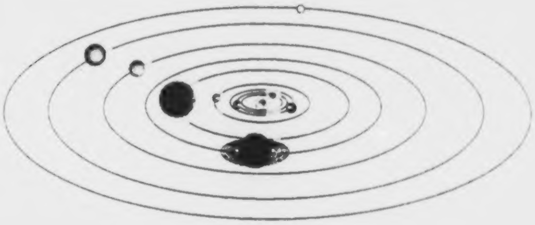
* * *

☐ Keep all returned worksheets. As the same problems are used year after year, and many students have siblings who may later participate in **SUPERSTARS III**, it is important that worksheets do not circulate.

* * *

☐ On weeks when **SUPERSTARS III** is not available post a notice such as "No star problems this week, but please come back after vacation for more!"

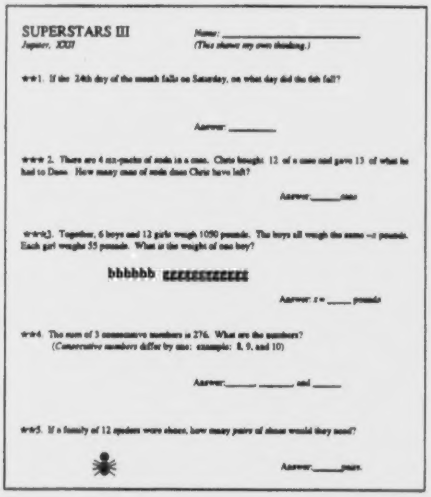
SUPERSTARS III: Information for Teachers



SUPERSTARS III is a program designed to complement your regular classroom mathematics curriculum. It offers a supplemental opportunity for students to practice mathematics skills appropriate for their grade level and at the same time to engage in challenging problem-solving activities. It is an additional challenge to those students who are self-directed learners providing them with an academic extracurricular activity.

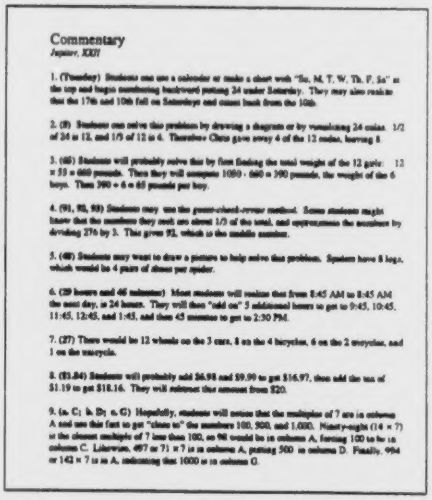
* * * *

Your involvement is essentially as a teacher. **SUPERSTARS III** will remain special to students if it is managed by someone outside of the classroom and if the teacher is viewed as a facilitator in the system, rather than as the authority figure. Your primary role is to monitor the system in your own classroom and to host a brief problem-solving session for **SUPERSTARS III** students on Friday of each week. You will also need to release the participating students from your class at a set time on Mondays to enable them to turn in completed work and receive new problem sets. You might make a special pin or banner for Mondays and Fridays to remind students that those days are special.



SUPERSTARS III

Name:



Commentary

Each student worksheet has an accompanying commentary page. This sheet provides hints on parallel problems which you might use in the Friday problem-solving session. It is important that students participate actively in this session, and that you

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solicit from them their unique and varied approaches to the problems discussed. Only after students have presented their ideas should you provide guidance on the problems and then only if they are having difficulty. Even though there is a commentary provided for each problem, you will have to decide which two to four problems you will cover during this brief session. Concentrate on those which provide a new or unfamiliar strategy. The problem-solving session should last no more than 15 minutes.

* *

Do not be disappointed if a large number of your students begin **SUPERSTARS III** and then significant numbers drop out after a few weeks. This is normal; problem solving requires a great deal of effort and not every student is ready for this challenge. On the other hand, you will notice that some students will choose to stay with **SUPERSTARS III** week after week even though they are not as successful as other students at earning stars. Their participation should be encouraged as they are certainly learning from the experience. Under no circumstances should **SUPERSTARS III** be reserved only for the advanced students in your class.

* * *

As a purely practical consideration, students are not to discuss the problems among themselves or with their families prior to the Friday cooperative group session. This allows the "think time" necessary for students to develop into independent thinkers; it also prevents students from earning stars for work that is basically someone else's -- the surest way to disrupt the entire **SUPERSTARS III** program. As the teacher you must monitor this in your classroom and ensure that students abide by the established rule.

⁂

It is important that you understand and support the overall philosophy of **SUPERSTARS III**. Do not worry if students encounter problems for which they have not been prepared in class -- such is the nature of true problem solving. Do not provide remedial instruction to ensure that students master certain types of problems. They will meet these same problem types repeatedly in the program. They will likely learn them on their own and from listening to other students at the problem-solving sessions. Enjoy what the students can do and don't worry about what they can't do. Read the general information and philosophy of the program to see how your role fits into the complete system.

Here are some thoughts you might find useful in your support for **SUPERSTARS III**:

☆ ☆ ☆

☐ Allow your students to leave the classroom at the designated time on Mondays to turn in their worksheets and pick up new ones.

☆ ☆

☐ Read each week's worksheet and feel free to structure classroom activities that parallel those in the **SUPERSTARS III** problems.

☆ ☆ ☆

☐ During the school week students may be allowed to work on their **SUPERSTARS III** problems during their free time, but the only help they may receive is for someone to read the problems to them. Give the students one warning if you find them discussing the worksheets, and take away their papers for the next violation. If it happens another time, suspend them from the program for a month.

☆

☐ At the Friday problem-solving sessions remember these points:

- Students come to this session with their worksheets, but without pencils.

- The session should be brief -- 15 minutes at most. Discuss only the two to four most difficult problems.

- Help students summarize their own approaches to the problems in a non-judgmental fashion. Offer your own approach last, and only if it is different from the students' strategies. Do not allow answers to be given to the problems.

- End the session by encouraging students to complete the problems over the weekend. Put your initials beside any problem discussed in class which a student has already successfully completed. The assisting adult will award double stars for these.

☆ ☆

☐ Remember that part of the **SUPERSTARS III** philosophy is that students learn responsibility by following the rules of the system. If participation is important to them they will adhere to the rules about where their names go on each paper, no credit awarded if they forget their paper on Monday, and no talking about problems prior to the problem-solving session.

☆ ☆ ☆

☐ Enjoy **SUPERSTARS III**. Students will impress you with their ability to think and their creative ways to solve problems that appear to be above their level or beyond their experience.

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Dear Student,

Welcome to **SUPERSTARS III**, a program designed to enhance your journey through mathematics. Be prepared to face challenging problems which require *thinking*! As you work through the system you will experience many types of problems, stretching and expanding your brainpower in many exciting ways!

Expect to receive one worksheet at the beginning of each week. You will have the rest of the week to think about the problems and come up with strategies for their solutions. The thinking and solutions must be YOUR VERY OWN!!! Once a week you will attend a help session to discuss the most challenging problems for the week.

Your journey will be recorded by charting the stars you earn. Each problem is ranked according to its level of difficulty. The more stars you see beside a problem, the higher its level of difficulty and, of course, the more stars you can earn for solving it. You can earn double stars for solving a problem before the weekly sessions.

Your signature is just the beginning.

Good luck as you embark upon this mathematical adventure! The rewards will last a lifetime!

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I am ready to begin the **SUPERSTARS III** program. All of the answers I submit will represent my own thinking.

Name:____

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Dear Parents,

Welcome to **SUPERSTARS III,** a program designed to enhance your child's journey through mathematics. By expressing an interest in challenging problem solving experiences, your student has taken the first step toward becoming an independent learner who is willing to address many types of problems.

On Mondays a **SUPERSTARS III** worksheet will be distributed to each child in the program. Each problem in the set is ranked according to its level of difficulty. As the number of stars increases, so does the level of difficulty and the earned stars to be awarded.

Each Friday a help session will be conducted to discuss the most challenging problems of the week. Any problem solved prior to the session will be given double stars. After the session, problems may be reworked before they are submitted the following Monday.

Your role in **SUPERSTARS III** is to encourage and facilitate problem solving. Feel free to offer guidance toward certain strategies, to read the problems to your child, but please, do not give them the answers. In order for this program to be effective, the students must work independently. The thinking must be their own!

It is normal for a student not to be able to complete every problem on every worksheet. The process of interpreting, understanding, and trying different strategies is valuable in the attainment of mathematical power. Remember, no student is expected to know the answer to every problem.

Thank you for allowing your child to embark upon this mathematical adventure; the rewards should last a lifetime!

____signature

Parent/Guardian of___________________________________

☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆

After you have had a chance to review and use these materials, please take a moment to let us know if the **SUPERSTARS III** material has been useful to you. Your evaluation and feedback is important to us as we continue to work on additional curriculum materials. Please respond to:

Linda Patch
Mathematics & Science Section
NC Department of Public Instruction
301 N. Wilmington Street
Raleigh, NC 27601-2825

Indicate the extent to which you agree with statements 1-4.

	Strongly Disagree		Neither Agree nor Disagree		Strongly Agree
1. The materials will be helpful in teaching the mathematics goals and objectives set forth in the NC Standard Course of Study.	1	2	3	4	5
2. The materials are appropriate for the grade level indicated.	1	2	3	4	5
3. The problems are interesting and engaging for the students I teach.	1	2	3	4	5
4. The commentaries will encourage use of this material.	1	2	3	4	5

5. I plan to use these materials with my students in grade______.

6. Have you ever used earlier versions of the SUPERSTARS material? YES NO

7. How was this program implemented with your students?

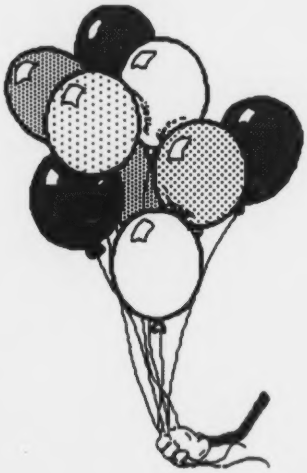
8. Additional comments:

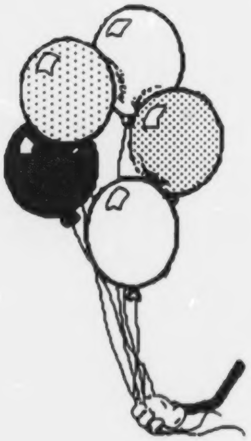
★ 1. ______________ ______________
(FIRST NAME) (LAST NAME)

★ 2. What is the phone number to dial for emergency help?

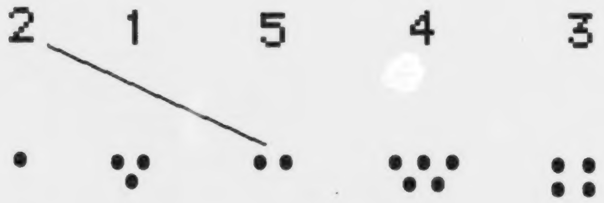
_____ _____ _____

★ 3. Color the picture with the most balloons.





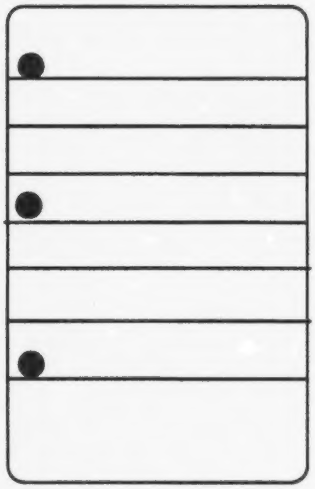
★★★★ 4. Draw a line from the number to the same amount of dots. (The first one is done for you.)



(Parents: Reading the problem to your child is ALWAYS okay. You can also help them, but if you do, initial the problem and they will receive partial credit.)

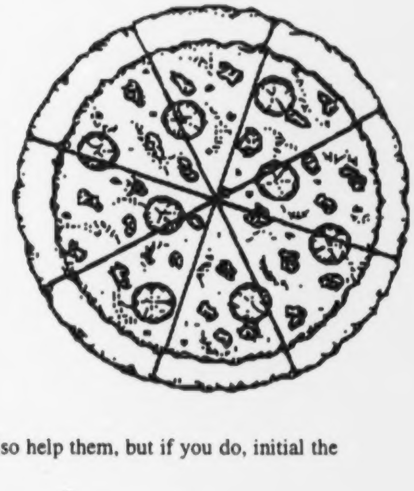
★★ 5. How many holes are on this paper? ____

How many lines are on this paper? ____



★★ 6. How many slices of pizza are there? ____

Color in 2 slices.



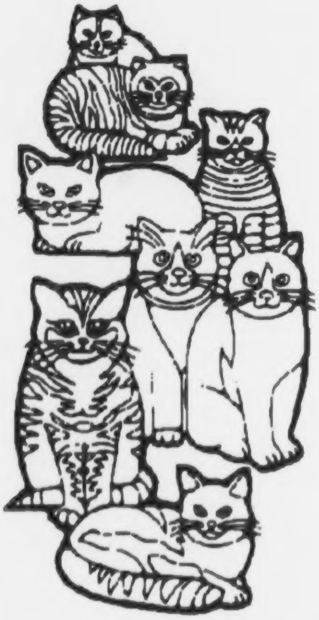
(Parents: Reading the problem to your child is ALWAYS okay. You can also help them, but if you do, initial the problem and they will receive partial credit.)

★ 1. ______________ ______________
(FIRST NAME) (LAST NAME)

★★ 2. Color in every other square:

☐ ☐ ☐ ☐ ☐ ☐

★★ 3. How many cats are there?



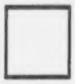
★★★ 4. If you gave a friend 2 cookies, and he ate 1 cookie, how many cookies would he have left?

___

(Parents: Reading the problem to your child is ALWAYS okay. If you help them solve the problems, please initial the problem and they will receive partial credit.)

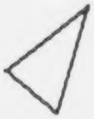
★★★ 5. How many sides does this square have?

___



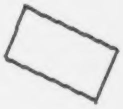
How many sides does this triangle have?

___



How many sides does this rectangle have?

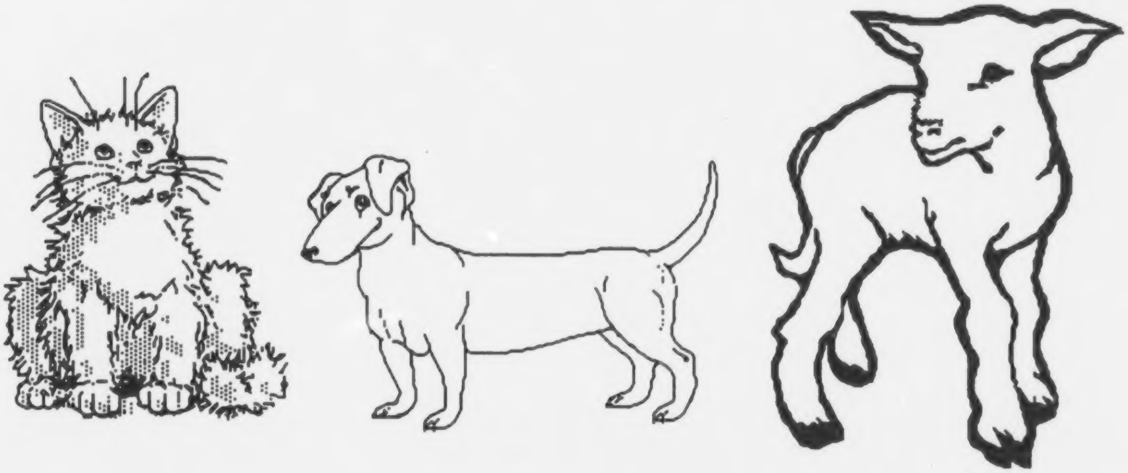
___



★★★ 6. How many noses are there? ___

How many ears are there? ___

How many legs are there? ___



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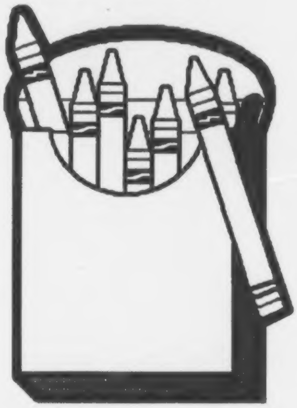
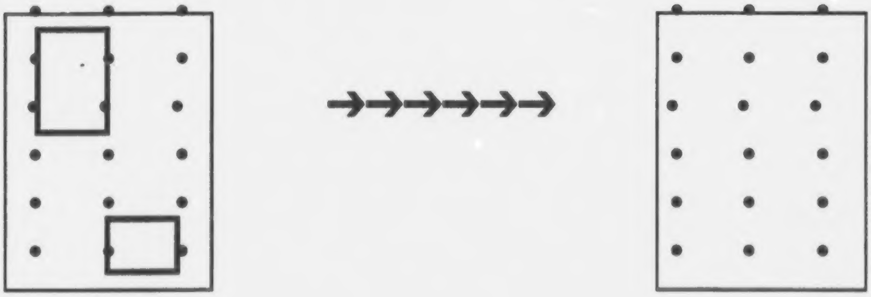
STAR PROBLEMS
Mercury-3

★1. ______________ ______________
(FIRST NAME) (LAST NAME)

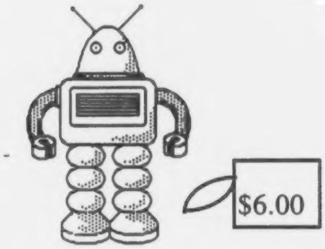
★ 2. How many crayons? ____

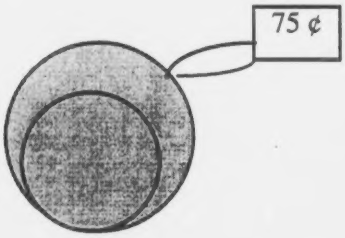


★★ 3. Copy the pattern exactly.



★★★ 4. Color in the toy that costs more money.



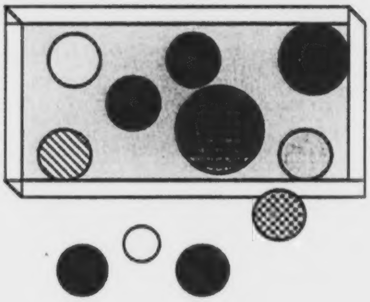


(Parents: Reading the problems to your child is ALWAYS encouraged. If you give them help other than that, please initial the problem and they will be given partial credit.)

★★★ 5. How many balls are inside the box?____

How many balls are outside the box?___

How many balls are there altogether?____

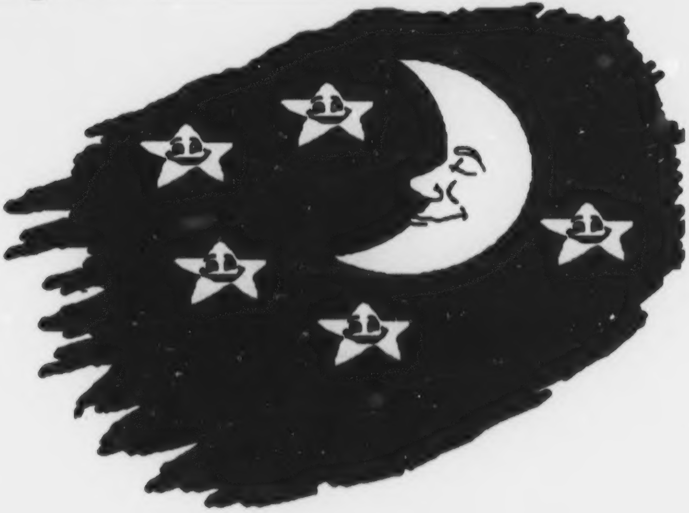


★★★★ 6. How many suns are there? ________

How many stars are there? ________

How many moons are there? ________

How many suns, moons, and stars together?_________



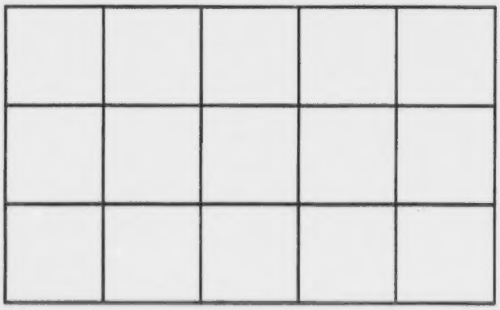
(Parents: Reading the problems to your child is ALWAYS encouraged. If you give them help other than that, please initial the problem and they will be given partial credit.)

STAR PROBLEMS
Mercury- 4

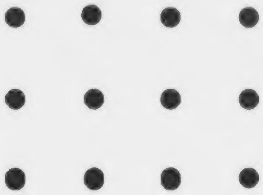
★ 1. ______________ ______________
(FIRST NAME) (LAST NAME)

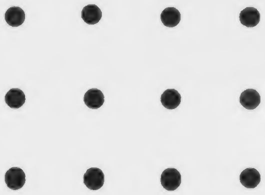
★★★ 2. Color 6 squares blue and 6 squares red. How many are left that are not colored?

____

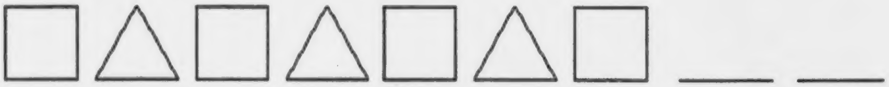


★ 3. Circle 2 dots below: Circle 5 dots below:



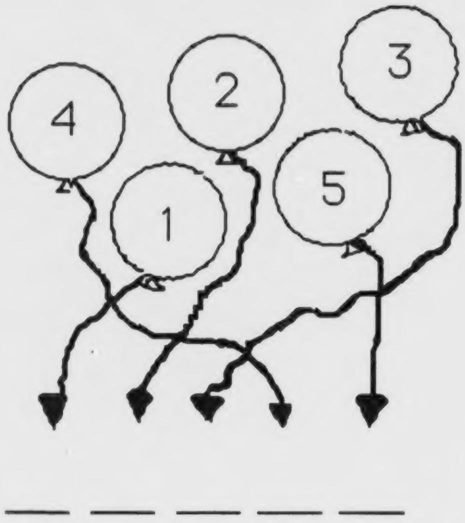


★★ 4. Draw the last two missing pattern pieces.



(Parents: Reading the problems with your child is ALWAYS encouraged. If you give them help other than that, please initial the problem and they will be given partial credit.)

★★ 5. Follow the string and write the number on the line.



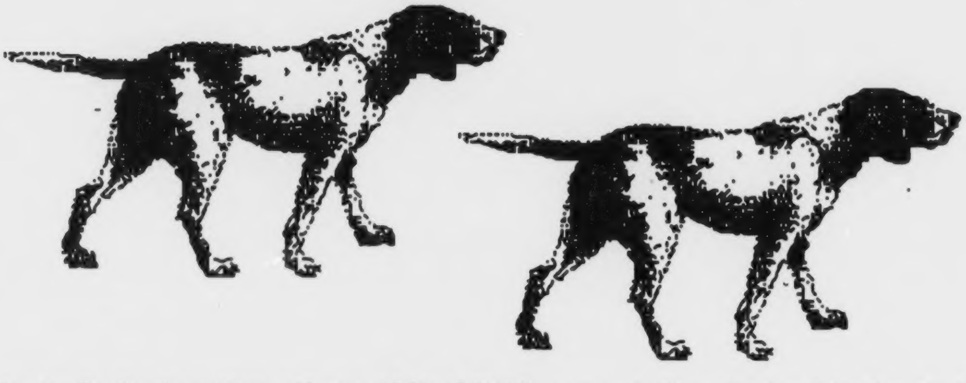
★★★★ 6. How many dogs are there? ____

How many legs do you see? ____

How many tails are there? ____

How many eyes do these two dogs have?

____



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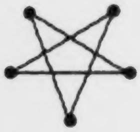
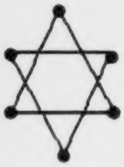
STAR PROBLEMS ★1_________________ ____________________
Mercury- 5 (FIRST NAME) (LAST NAME)

★★ 2. How many points are on this star? _____



How many points are on this star? _____



★ 3. Color the star above that has more points.

★★★★4.

○	○	○	○	○	○				
☆	☆								
❑	❑	❑	❑	❑	❑	❑			

How many circles (○) are there? ______

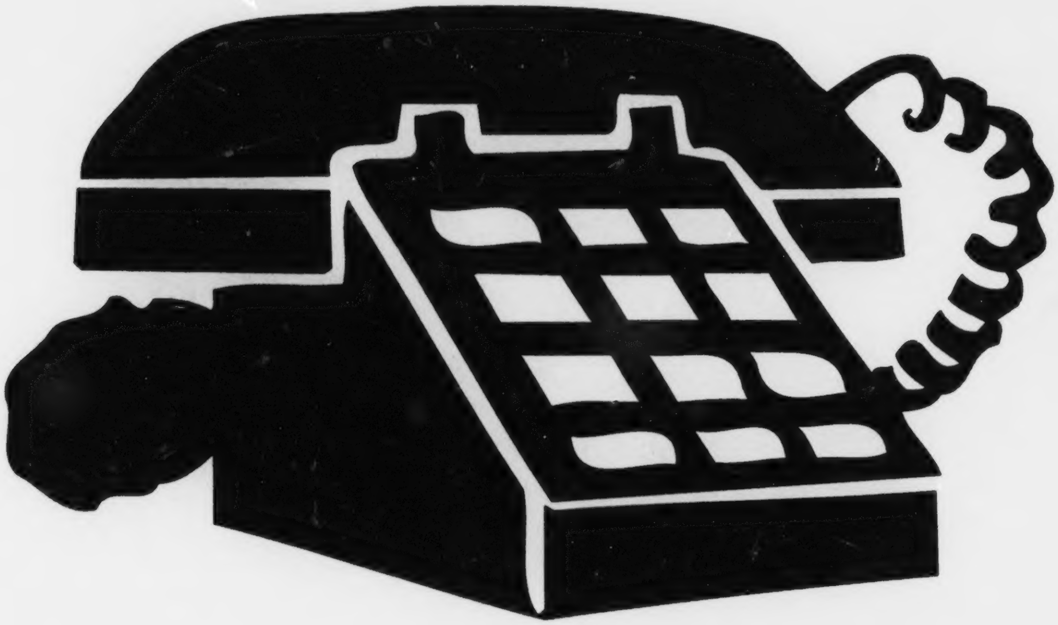
How many squares (❑) are there? ______

How many stars (☆) are there? ______

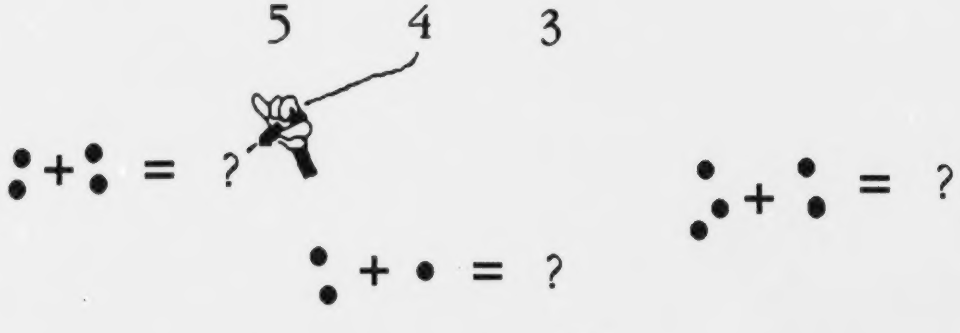
(Parents: Reading the problem to your child is ALWAYS encouraged. If you give them help other than that, please initial the problem and they will be given partial credit.)

Put a ✔ for each year old you are, in the bottom row.

★★★ 5. Look at a telephone. Put numbers on the buttons below.



★★ 6. Draw a line from the problem to the correct answer.

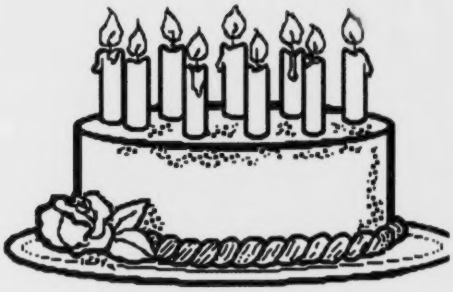


(Parents: Reading the problem to your child is ALWAYS encouraged. If you give them help other than that, please initial the problem and they will be given partial credit.)

STAR PROBLEMS
Mercury- 6

★1 ____________ ____________
(FIRST NAME) (LAST NAME)

★ 2. How old is Eric? __
(count the candles)

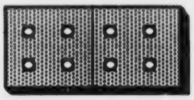
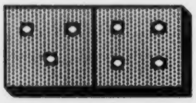
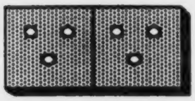
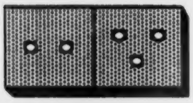
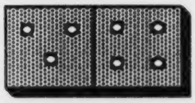
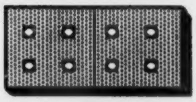
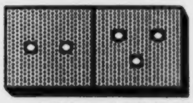
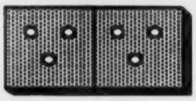


★★ 3. Fill in the missing numbers:

1 2 3 __ 5

6 7 __ 9 10

★★★★ 4. Match the dominoes by drawing a line to the same one.

(Parents: Reading the problem to your child is ALWAYS encouraged. If you give them help other than that, please initial the problem and they will be given partial credit.)

★★★★★5.

Color in 1 → #1

Color in 2 → #2's

Color in 3 → #3's

Color in 4 → #4's

Color in 5 → #5's

1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5

★★★★ 6. Count objects to help you do these.

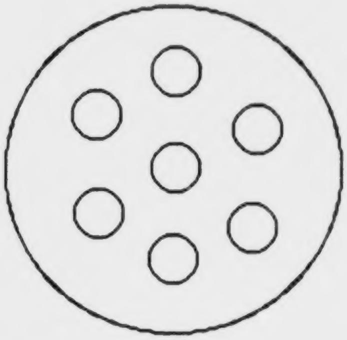
1	3	2	1
+1	+1	+1	+4
—	—	—	—
8	1	7	5
+1	+6	+1	+1
—	—	—	—

(Parents: Reading the problem to your child is ALWAYS encouraged. If you give them help other than that, please initial the problem and they will be given partial credit.)

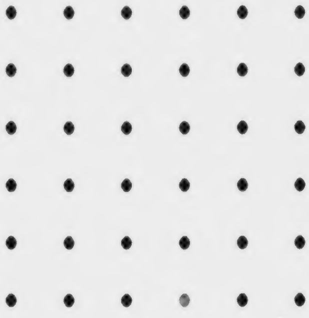
STAR PROBLEMS
Mercury- 7

★1. ________________ ________________
(FIRST NAME) (LAST NAME)

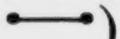
★★ 2. How many circles are there? (Total)



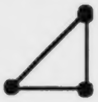
★★★3.



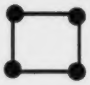
Connect 2 dots for a line.

()

Connect 3 dots for a triangle.

()

Connect 4 dots for a square.

()

★★★ 4. Write in the next number.

1 2 3 4 ___

3 4 5 6 ___

5 6 7 8 ___

(Parents: Reading the problem to your child is ALWAYS encouraged. If you give them help other than that, please initial the problem and they will be given partial credit.)

★★★★ 5. Fill in the missing number in each row.

6 7 8 9 __

6 __ 8 9 10

6 7 __ 9 10

6 7 8 __ 10

★★★★ 6. If A = 1

B = 2

C = 3

D = 4

E = 5

F = 6

then A+B+C = _____

(Parents: Reading the problem to your child is ALWAYS encouraged. If you give them help other than that, please initial the problem and they will be given partial credit.)

STAR PROBLEMS
Mercury- 8

★1. ____________ ______________
(FIRST NAME) (LAST NAME)

★ 2. Write in the numbers from 1 to 10.

___ ___ ___ ___ ___

___ ___ ___ ___ ___

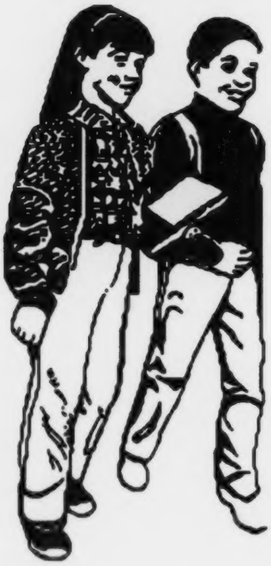
★ 3. Efrem is 7 years old.

☐

Stephanie is 9 years old.

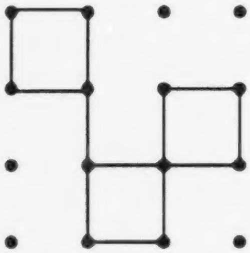
☐

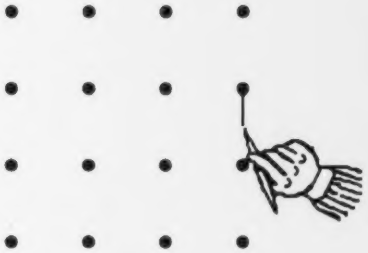
Who is older?
Put a ✔ in the box.



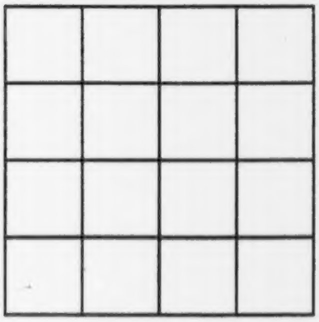
(Parents: Reading the problem to your child is ALWAYS encouraged. If you give them help other than that, please initial the problem and they will be given partial credit.)

★★★★ 4. Copy this pattern over to here.

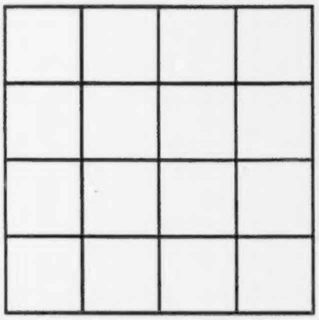




★★★ 5. Color 4 squares that touch each other to make 1 big square.



★★★★ 6. Color 6 squares that touch each other to make a rectangle.

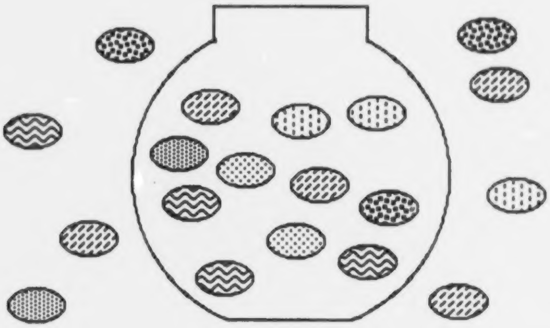


(Parents: Reading the problem to your child is ALWAYS encouraged. If you give them help other than that, please initial the problem and they will be given partial credit.)

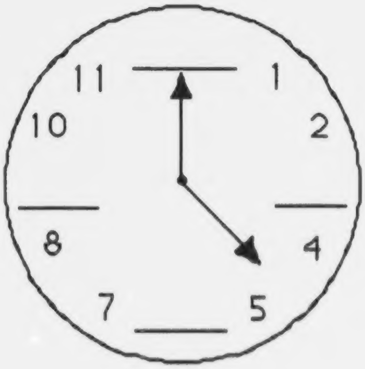
STAR PROBLEMS ★ 1. ________________ ____________________
Mercury-9 (FIRST NAME) (LAST NAME)

★ 2. How many jellybeans are in the bowl?

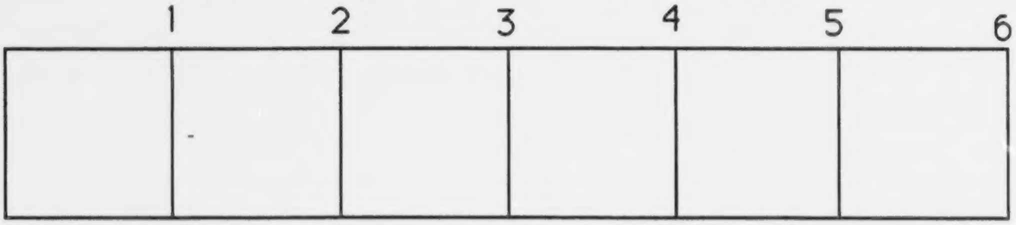
______



★ 3. Fill in the missing numbers on this clock.



★★ 4. Color in 4 inches.
(Each square is 1 inch long.)



(Parents: Reading the problem with your child is ALWAYS encouraged. If you give them help other than that, please initial the problem and they will receive partial credit.)

★★★★ 5. How many letters are there in the alphabet? ______

A B C D E F G H I

J K L M N O P Q R

S T U V W X Y Z

★★★★ 6. Circle Sunday, June 14.

JUNE 1992

S Sunday	M Monday	Tu Tuesday	W Wednesday	Th Thursday	F Friday	S Saturday
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

(Parents: Reading the problem with your child is ALWAYS encouraged. If you give them help other than that, please initial the problem and they will receive partial credit.)

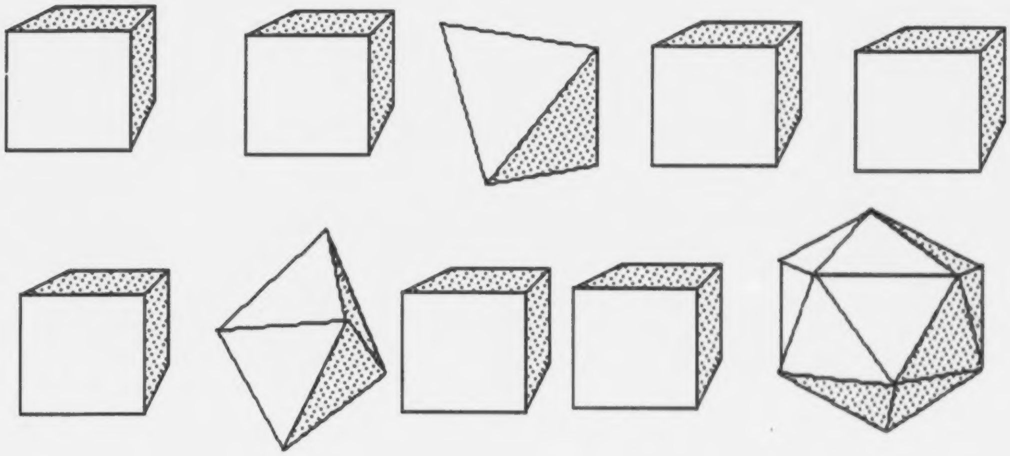
STAR PROBLEMS
Mercury- 10

★1. ____________________ ______________________
(FIRST NAME) (LAST NAME)

★★ 2. Fill in the numbers between 10 and 20.

10 ____ ____ ____ ____
____ ____ ____ ____ ____ 20

★ 3. How many cubes are there? __________



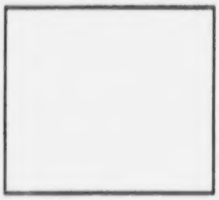
★★ 4. How much is:

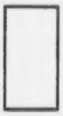
$$\begin{array}{r} 100 \\ +100 \\ \hline \end{array}$$

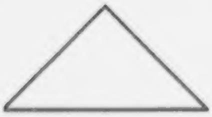
____

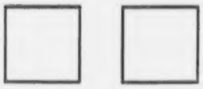
(Parents: Reading the problem with your child is ALWAYS encouraged. If you give them help other than that, please initial the problem and they will be given partial credit.)

★★★ 5. Draw a house using:

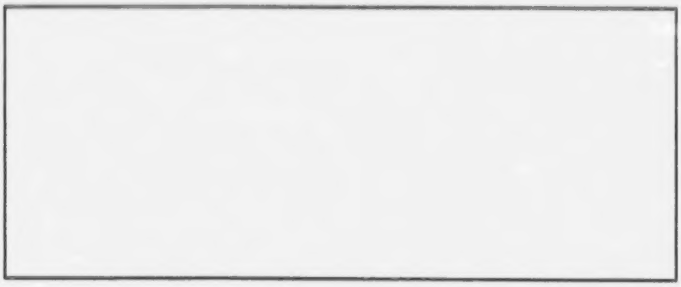
1 big square 

1 rectangle 

1 triangle 

2 small squares 

★★★★ 6. Use pennies to measure this rectangle.

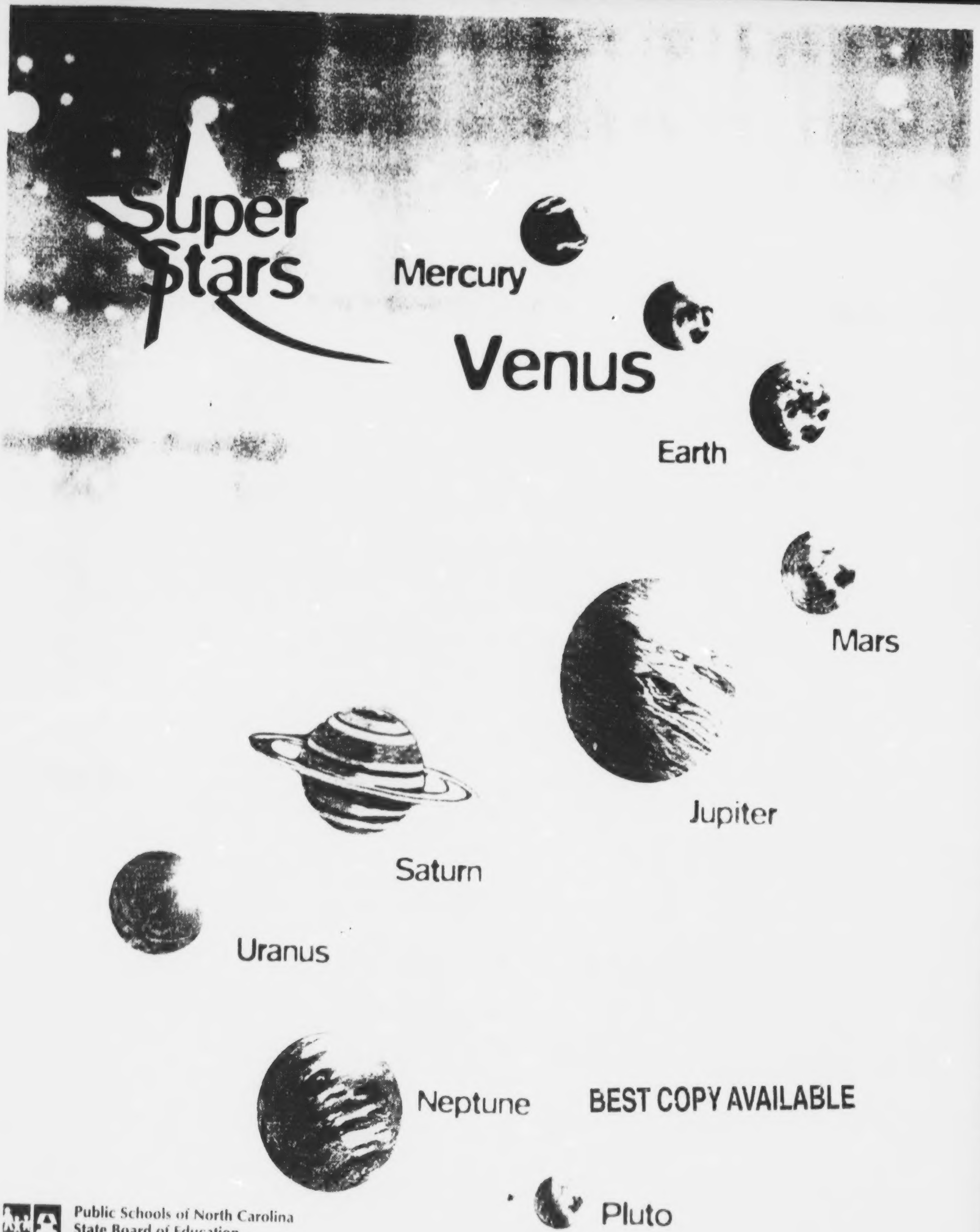


How many pennies wide is it? __________

How many pennies long is it ? __________

(Parents: Reading the problem with your child is ALWAYS encouraged. If you give them help other than that, please initial the problem and they will be given partial credit.)

Super Stars


Mercury
Venus
Earth
Mars
Jupiter
Saturn
Uranus
Neptune
Pluto

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Public Schools of North Carolina
State Board of Education
Department of Public Instruction
Division of Instructional Services

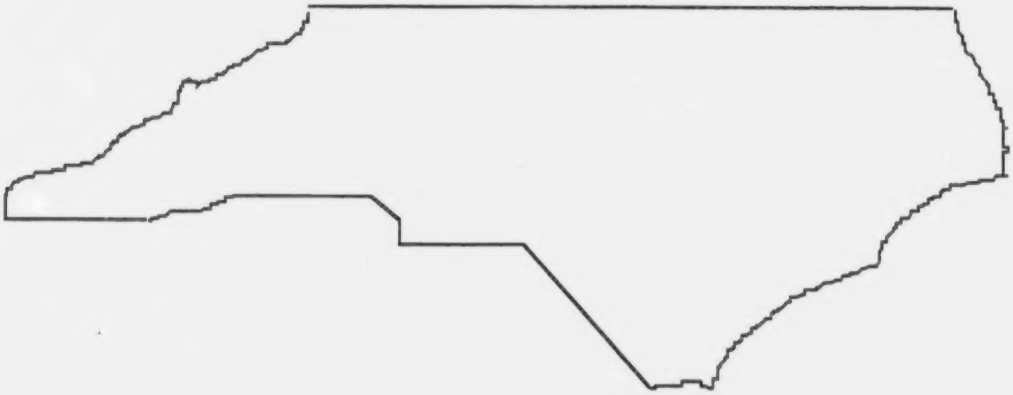
Published March 1998

☆ ACKNOWLEDGMENTS ☆

This project, originally designated ***Sunshine Math,*** is the third in a series of problem solving programs. It was conceived, coordinated and developed through the Florida Department of Education with input from the mathematics staff members of the North Carolina Department of Public Instruction and the South Carolina Department of Education. In addition, it was supported financially through a grant to the School Board of Polk County, Florida. The rich history of these materials and the predecessor programs, **SUPERSTARS** and **SUPERSTARS II** goes back to the early 1980's. Many Florida teachers have been involved in developing and using these materials over the years. The original **SUPERSTARS** programs were adopted and adapted by North Carolina and South Carolina with their teachers contributing to revisions and personalizations for use in their states. Florida educators were primarily responsible for developing, field testing, and publishing ***Sunshine Math.*** Educators from the Carolinas developed the **MathStars Newsletter** to accompany and enhance this program.

School districts in North Carolina have permission to reproduce this document for use in their schools for non-profit educational purposes. Copies of each grade level are available from the publications unit of the North Carolina Department of Public Instruction. The contact for **SUPERSTARS III** and the **MathStars Newsletter** is Linda Patch, 301 North Wilmington Street, Raleigh, NC 27601-2825 : (919-715-2225).

Michael E. Ward
State Superintendent
North Carolina Department of Public Instruction



☆ *Preface* ☆

SUPERSTARS III encourages and enhances the positive aspects of students, parents, teachers and administrators working together. This program assumes that students, even young children, are capable of and interested in learning; that teachers want to help them learn to think for themselves; that administrators see their jobs as clearing the path so that quality education is delivered effectively in their schools; and that parents care about their child's learning and are willing to work with the school system toward that goal. Each of these four groups has a vital role to play in implementing **SUPERSTARS III.**

The designer of this program has a long history of working with elementary children. He believes that they are capable of much more than we ask of them, and that many children are on the path to becoming independent learners. A number of children in any classroom are bright, energetic and willing to accept extra challenges.

The basic purpose of **SUPERSTARS III** is to provide the extra challenge that self-motivated students need in mathematics, and to do so in a structured, long-term program that does not impinge on the normal classroom routine or the time of the teacher. The system is not meant to replace any aspect of the school curriculum -- it is offered as a peripheral opportunity for students who identify with challenges and who want to be rewarded for their extra effort. Participation in the program is always optional -- only those students who voluntarily choose to participate will, in the long run, benefit from **SUPERSTARS III**. Any student, regardless of prior academic performance, should be encouraged to participate as long as interest is maintained.

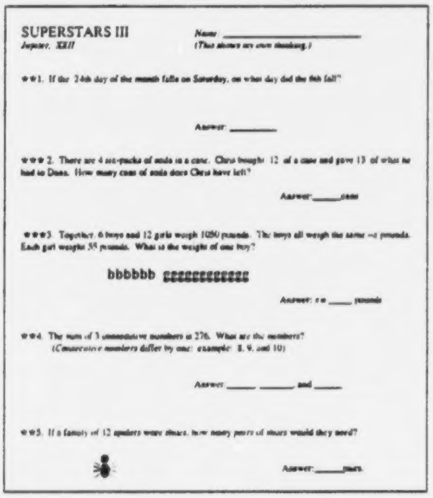
The predecessor program for **SUPERSTARS III** -- the **SUPERSTARS II** program -- has demonstrated that this concept can be extremely useful. What is required are several dedicated adults who devote a few hours each week to operate the system effectively in the school; an administrator who provides highly visible support; teachers who welcome a supplementary experience for their students to engage in higher-order thinking; and a typical classroom of students. If all of those ingredients are present **SUPERSTARS III** will become an integral part of the school fabric.

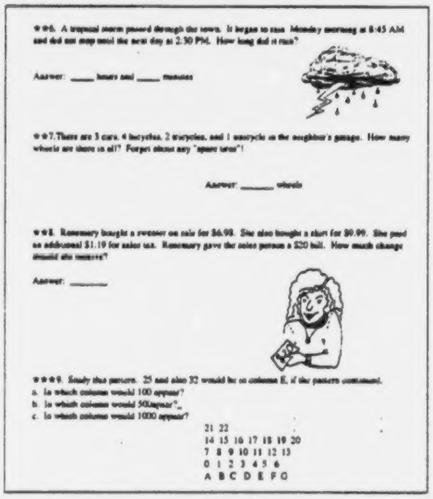
ORGANIZATION OF THESE MATERIALS

Section I Description of the **SUPERSTARS III** Program

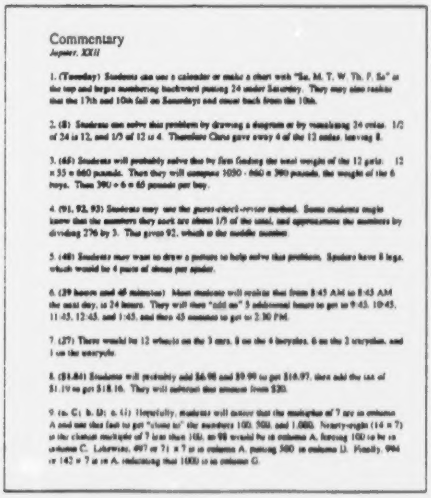
1. General Information
2. Information/checklist for principals
3. Information/checklist for assisting adults
4. Information for teachers
5. Letter to participating students and their parents.

Section II Student worksheets for **SUPERSTARS III**





Section III Commentary for student worksheets for **SUPERSTARS III**



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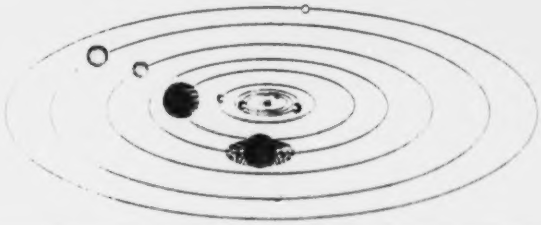
SUPERSTARS III: General Information

SUPERSTARS III is a K-8 program designed as an enrichment opportunity for self-directed learners in mathematics. The levels of the program are named for the planets in our solar system:



Kindergarten	Mercury	Fourth Grade	Jupiter
First Grade	Venus	Fifth Grade	Saturn
Second Grade	Earth	Sixth Grade	Uranus
Third Grade	Mars	Seventh Grade	Neptune
	Eighth Grade	Pluto	

Students of all ability levels choose on their own to participate in **SUPERSTARS III**. Seeing their names displayed in a prominent place in the school, with a string of stars indicating their success, is one reward students receive for their extra work. In some cases the school may decide to enhance this basic system by awarding certificates of achievement or some other form of recognition to highlight certain levels of success or participation in the **SUPERSTARS III** program.

SUPERSTARS III can function in a school in a number of different ways. A "tried and true" way is for assisting adults (volunteers, aides, etc.) to manage the program for the entire school, with support provided by school administrators and classroom teachers. This system has been adopted at the school level, with varying degrees of success, over the years. The basic model for conducting **SUPERSTARS III** is discussed below, with variations described on the next page.

The basic model

The basic model for **SUPERSTARS III** is for a school to establish a weekly cycle at the beginning of the academic year according to the following guidelines:

On Monday of each week student worksheets are distributed by the assisting adults to students in the program. Students have until Friday to complete the problems working entirely on their own. On Friday the classroom teacher holds a brief problem-solving session for the students in the program. The more difficult problems on the worksheet are discussed with students describing their thinking about strategies to solve the problems. They do not share solutions, only strategies.

Students receive double credit for those problems they have successfully completed prior to the problem-solving session, and regular credit for those they complete successfully over the week-end. On Monday all papers are handed in, checked by the assisting adult, and stars are posted for problems successfully completed. This completes one cycle of the **SUPERSTARS III** program.

SUPERSTARS III is not for every child -- it is only for those who are self-motivated and who are not easily frustrated by challenging situations. This does not diminish the value of the program, but rather makes us realize that there are children of all ability and socio-economic levels who are self-directed learners and who need challenges beyond those of the regular school day. These children will shine in **SUPERSTARS III.**

Variations of the basic model

The first variation that has been used successfully retains the weekly cycle and assisting adult role from the basic model. The teacher however, involves the entire class in the problem-solving discussions. For example, the teacher might select the four most difficult problems on the worksheet (indicated by three or four stars) and work a "parallel" problem with the entire class to open the mathematics lesson on Tuesday through Friday. Using this variation, all students are exposed to the problem-solving strategies, but only those who have chosen to participate in **SUPERSTARS III** will complete and turn in the worksheet on Monday.

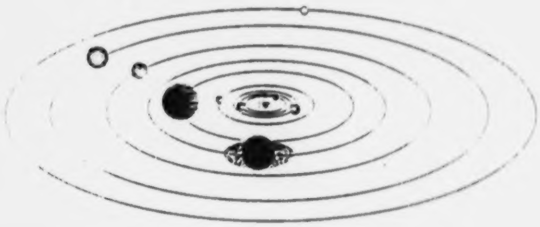
A second variation has the assisting adult manage the entire program, including the Friday problem-solving session . This method has been used in situations where teachers lacked commitment to the program and thus implemented it inconsistently. In such cases, the assisting adult must have a progressive view of what constitutes problem solving in elementary mathematics. They should also receive extra assistance from the administration to ensure that students are released from class and that the cycles proceed smoothly.

Yet another variation is for a parent to manage **SUPERSTARS III** at home for his or her own child. The basic rules are the same -- a child gets the worksheet once a week and time to work the problems alone. The parent sets a night to listen to the way the child thought about each problem, offering suggestions or strategies only when the child is unable to proceed. The reward system is basically the same, stars on a chart, but can be enhanced by doing something special with the child, such as a trip to the museum or to a sporting event when the child reaches certain levels of success. If this method is adopted, the parent must not try to teach the child, but rather to stimulate discussion of problem-solving strategies. **SUPERSTARS III** is not a program for adults to teach children how to think.

Other variations exist. The basic model as stated is the best, all other factors being equal, for reaching more children in a consistent fashion than any of the other methods. However, we encourage individual schools, teachers, or parents to get some version started; some starlight is better than none.

SUPERSTARS III: Information for Principals

SUPERSTARS III is a K-8 enrichment package for mathematics designed to be managed by volunteer assisting adults with coordinated support from the classroom teacher and school administrators. The purpose of the program is to give self-motivated students of all ability levels a chance to extend themselves beyond the standard mathematics curriculum. The complete set of materials comes in nine packages, one for each grade K-8. The grade levels are identified by the names of the nine planets in our solar system and their order from the sun:



Mercury - Kindergarten
Venus - First Grade
Earth - Second Grade
Mars - Third Grade
Jupiter - Fourth Grade
Saturn - Fifth Grade
Uranus - Sixth Grade
Neptune - Seventh Grade
Pluto - Eighth Grade.

Your support is vital if this program is to succeed. As the school administrator, you need to stay in close contact with the **SUPERSTARS III** program. A "checklist for success" follows:

☐ Become familiar with the philosophy and component parts of the program.

☐ Introduce **SUPERSTARS III** to the faculty early in the school year. Ensure that teachers understand the philosophy of the program and have copies of the student worksheets and commentaries appropriate for their grade levels.

☐ Speak to parents at your school's first open house of the year, explaining the purpose of **SUPERSTARS III** and the long term value of children working independently on challenging problems.

☐ Recruit several assisting adults (PTA members, aides, senior citizens, business partners, church members, etc.) who are enthusiastic, dependable people who are willing to manage the program. Early in the academic year, meet with these assisting adults to plan such details as:

✓ A prominent place and format for the STAR CHART.

✓ A designated time and place each Monday and Friday for the assisting adults to be in school to meet with students, distribute and collect worksheets, and post stars.

✓ A system for the activity sheets to be duplicated each week.

✓ A plan for extra incentives for accumulating stars. ("World records" to be kept from year-to-year, a celebration day planned for the end of school, prizes earned by students for attaining certain levels of success -- see the diagram below for examples.)

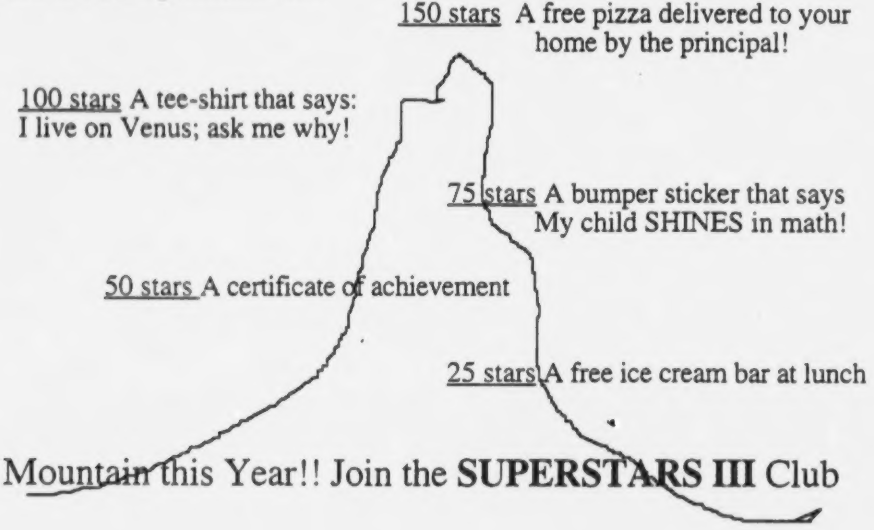
✓ A schedule for the initiation of the program and a decision as to a "start over" point later in the academic year. Review the school calendar and only use weeks that are at least four days long. If there is not enough time in the year to complete all the activity sheets, decide which to eliminate or on a plan to "double up."

✓ A **SUPERSTARS III** cap, name badge, tee-shirt, or other distinction for volunteers, if possible.

☐ Monitor the program every two weeks to get ahead of unforeseen difficulties. Administrators need to be highly visible and supportive for **SUPERSTARS** to succeed.

SUPERSTARS III is an optional program for students. It should be available to any student who wants to participate, regardless of prior success in mathematics. Typically, a large number of students will begin the program, but a majority will lose interest. A significant number however, will continue their efforts over the life of the program. This is normal and simply means that **SUPERSTARS III** is successfully addressing the needs of the self-directed learner.

Visual reminders help children see this mathematics program is challenging and rewarding. Some ideas are presented here:



150 stars A free pizza delivered to your home by the principal!

100 stars A tee-shirt that says: I live on Venus; ask me why!

75 stars A bumper sticker that says My child SHINES in math!

50 stars A certificate of achievement

25 stars A free ice cream bar at lunch

Climb the Mountain this Year!! Join the **SUPERSTARS III** Club

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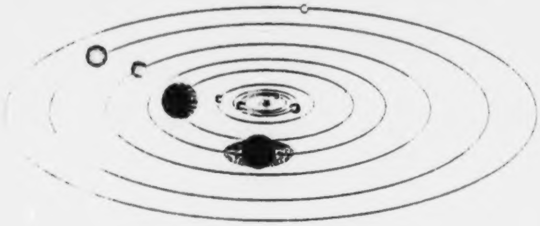
SUPERSTARS III: Information for Assisting Adults



SUPERSTARS III is designed to give assisting adults a well-defined role to play in the school's mathematics program. The success of **SUPERSTARS III** depends upon a team effort among teachers, administrators, parents and you. Reliability and punctuality are important - students will quickly come to depend upon you to be there as scheduled, to check their papers and post their stars, and to listen to alternate strategies and interpretations of problems to help them arrive at solutions. If possible, wear an outfit or badge that fits with the **SUPERSTARS III** theme or logo; students will soon identify you as an important person in their school.

* * *

SUPERSTARS III works on a weekly cycle. Each Monday you will collect the worksheets from the previous week and distribute new worksheets to the participating students, all from your **SUPERSTARS III** area of the school. Allow students to see the answers to the problems, discuss any for which their answers differ and allow them credit if their interpretation and reasoning are sound. After checking all the work, you will post the stars earned by students on the STAR CHART.

* * *

Participating students have from Monday until Friday to work the problems entirely on their own -- the only help they should receive during that time is for someone to read the problems to them. On Friday the teacher will host a problem-solving session in the classroom where students will describe the strategies they used to approach the more difficult problems. Students who have successfully completed problems before this session will receive double points for their efforts. The teacher's initials on the worksheet will help you identify those problems. The students then have the week-end to complete or correct their problems and turn them in on Monday. All the correct problems thus completed will receive the indicated number of stars.

* * *

Be creative when designing your STAR CHART. The basic method of posting stars individually is a good way to begin but eventually you will want a more efficient system. Color coding by grade level, or posting just one star each week with a number in its center are ideas to consider. You may wish to personalize the chart and the entire **SUPERSTARS III** center with student pictures, "smiling faces", a logo, seasonal theme or some other feature that has a mathematical flavor. Occasionally feature a reward for each child such as a cookie or a hand stamp in the shape of a star just for turning in the worksheet. You are helping enthusiastic students develop high-level thinking skills -- be creative and enjoy your role!

Checklist for assisting adults:

☐ Plan the following with the principal:

✓ A prominent place and format for the

☆STAR CHART☆

✓ The time and place for you to collect, check, and distribute worksheets.

✓ A system for duplicating worksheets each week which ensures legible copies. Also a secure storage area for masters and other materials.

✓ Any additional incentives ("world records," stickers, coupons, pencils, tee-shirts, etc.) that will be part of the system for rewarding levels of achievement in **SUPERSTARS III**.

*

☐ Make the **SUPERSTARS III** center a happy place. Use bright colors, smiles, and cheerful expressions. Show confidence, friendliness, and encouragement to students.

* * *

☐ Collect the letters that are sent home prior to the first worksheet. These need to be signed by each student and a parent. If, in the future, you have evidence that the work submitted does not represent the thinking of the student, discuss the situation with the classroom teacher. These situations are best handled individually, confidentially and in a firm, consistent manner.

☆ ☆

☐ Check the worksheets from the previous week uniformly. If you give partial credit for a problem with several parts do so in a fair way that can be understood by the students. Do not award partial credit for problems with only one answer.

☆ ☆ ☆ ☆

☐ Have answer sheets available and encourage students to look at the solutions when they submit their worksheets. Allow them to explain their strategy or interpretation if they have arrived at a different answer. Award full credit if they show a unique and plausible interpretation of a problem and follow sound logic in arriving at their response.

☆ ☆ ☆

☐ Leave extra worksheets with the classroom teacher for participating students who were absent on Monday. Accept a late-arriving worksheet only if the student was absent on Monday. If a student's name is missing or in the wrong place on the worksheet, check the paper but award stars to "No Name" on the STAR CHART. Adhering strictly to these rules will rapidly teach responsibility to the students and keep your work manageable.

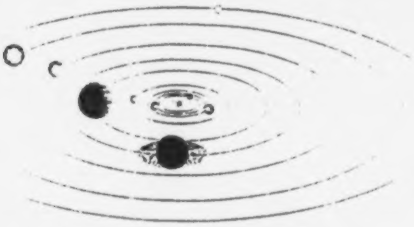
☆ ☆ ☆ ☆ ☆

☐ Keep all returned worksheets. As the same problems are used year after year, and many students have siblings who may later participate in **SUPERSTARS III**, it is important that worksheets do not circulate.

☆ ☆ ☆ ☆

☐ On weeks when **SUPERSTARS III** is not available post a notice such as "No star problems this week, but please come back after vacation for more!"

SUPERSTARS III: Information for Teachers

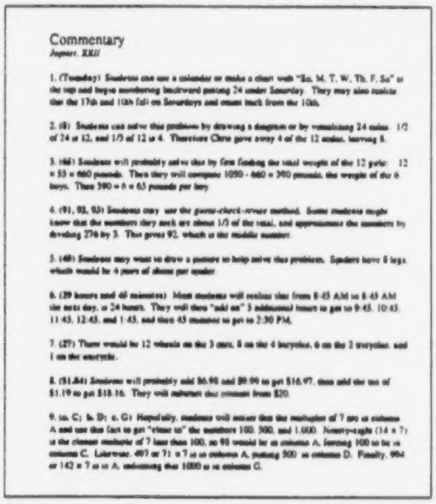


SUPERSTARS III is a program designed to complement your regular classroom mathematics curriculum. It offers a supplemental opportunity for students to practice mathematics skills appropriate for their grade level and at the same time to engage in challenging problem-solving activities. It is an additional challenge to those students who are self-directed learners providing them with an academic extracurricular activity.

* * *

Your involvement is essentially as a teacher. **SUPERSTARS III** will remain special to students if it is managed by someone outside of the classroom and if the teacher is viewed as a facilitator in the system, rather than as the authority figure. Your primary role is to monitor the system in your own classroom and to host a brief problem-solving session for **SUPERSTARS III** students on Friday of each week. You will also need to release the participating students from your class at a set time on Mondays to enable them to turn in completed work and receive new problem sets. You might make a special pin or banner for Mondays and Fridays to remind students that those days are special.

SUPERSTARS III



Commentary

Each student worksheet has an accompanying commentary page. This sheet provides hints on parallel problems which you might use in the Friday problem-solving session. It is important that students participate actively in this session, and that you

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solicit from them their unique and varied approaches to the problems discussed. Only after students have presented their ideas should you provide guidance on the problems and then only if they are having difficulty. Even though there is a commentary provided for each problem, you will have to decide which two to four problems you will cover during this brief session. Concentrate on those which provide a new or unfamiliar strategy. The problem-solving session should last no more than 15 minutes.

☆ ☆

Do not be disappointed if a large number of your students begin **SUPERSTARS III** and then significant numbers drop out after a few weeks. This is normal; problem solving requires a great deal of effort and not every student is ready for this challenge. On the other hand, you will notice that some students will choose to stay with **SUPERSTARS III** week after week even though they are not as successful as other students at earning stars. Their participation should be encouraged as they are certainly learning from the experience. Under no circumstances should **SUPERSTARS III** be reserved only for the advanced students in your class.

☆ ☆ ☆

As a purely practical consideration, students are not to discuss the problems among themselves or with their families prior to the Friday cooperative group session. This allows the "think time" necessary for students to develop into independent thinkers; it also prevents students from earning stars for work that is basically someone else's -- the surest way to disrupt the entire **SUPERSTARS III** program. As the teacher you must monitor this in your classroom and ensure that students abide by the established rule.

☆

It is important that you understand and support the overall philosophy of **SUPERSTARS III**. Do not worry if students encounter problems for which they have not been prepared in class -- such is the nature of true problem solving. Do not provide remedial instruction to ensure that students master certain types of problems. They will meet these same problem types repeatedly in the program. They will likely learn them on their own and from listening to other students at the problem-solving sessions. Enjoy what the students can do and don't worry about what they can't do. Read the general information and philosophy of the program to see how your role fits into the complete system.

Here are some thoughts you might find useful in your support for **SUPERSTARS III**:

* * *

☐ Allow your students to leave the classroom at the designated time on Mondays to turn in their worksheets and pick up new ones.

* *

☐ Read each week's worksheet and feel free to structure classroom activities that parallel those in the **SUPERSTARS III** problems.

* * *

☐ During the school week students may be allowed to work on their **SUPERSTARS III** problems during their free time, but the only help they may receive is for someone to read the problems to them. Give the students one warning if you find them discussing the worksheets, and take away their papers for the next violation. If it happens another time, suspend them from the program for a month.

*

☐ At the Friday problem-solving sessions remember these points:

- Students come to this session with their worksheets, but without pencils.

- The session should be brief -- 15 minutes at most. Discuss only the two to four most difficult problems.

- Help students summarize their own approaches to the problems in a non-judgmental fashion. Offer your own approach last, and only if it is different from the students' strategies. Do not allow answers to be given to the problems.

- End the session by encouraging students to complete the problems over the weekend. Put your initials beside any problem discussed in class which a student has already successfully completed. The assisting adult will award double stars for these.

☆☆

☐ Remember that part of the **SUPERSTARS III** philosophy is that students learn responsibility by following the rules of the system. If participation is important to them they will adhere to the rules about where their names go on each paper, no credit awarded if they forget their paper on Monday, and no talking about problems prior to the problem-solving session.

☆☆☆

☐ Enjoy **SUPERSTARS III**. Students will impress you with their ability to think and their creative ways to solve problems that appear to be above their level or beyond their experience.

* * *

Dear Student,

Welcome to **SUPERSTARS III**, a program designed to enhance your journey through mathematics. Be prepared to face challenging problems which require *thinking*! As you work through the system you will experience many types of problems, stretching and expanding your brainpower in many exciting ways!

Expect to receive one worksheet at the beginning of each week. You will have the rest of the week to think about the problems and come up with strategies for their solutions. The thinking and solutions must be YOUR VERY OWN!!! Once a week you will attend a help session to discuss the most challenging problems for the week.

Your journey will be recorded by charting the stars you earn. Each problem is ranked according to its level of difficulty. The more stars you see beside a problem, the higher its level of difficulty and, of course, the more stars you can earn for solving it. You can earn double stars for solving a problem before the weekly sessions.

Your signature is just the beginning.

Good luck as you embark upon this mathematical adventure! The rewards will last a lifetime!

* * *

I am ready to begin the **SUPERSTARS III** program. All of the answers I submit will represent my own thinking.

Name:____

* * *

☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆

Dear Parents,

Welcome to **SUPERSTARS III,** a program designed to enhance your child's journey through mathematics. By expressing an interest in challenging problem solving experiences, your student has taken the first step toward becoming an independent learner who is willing to address many types of problems.

On Mondays a **SUPERSTARS III** worksheet will be distributed to each child in the program. Each problem in the set is ranked according to its level of difficulty. As the number of stars increases, so does the level of difficulty and the earned stars to be awarded.

Each Friday a help session will be conducted to discuss the most challenging problems of the week. Any problem solved prior to the session will be given double stars. After the session, problems may be reworked before they are submitted the following Monday.

Your role in **SUPERSTARS III** is to encourage and facilitate problem solving. Feel free to offer guidance toward certain strategies, to read the problems to your child, but please, do not give them the answers. In order for this program to be effective, the students must work independently. The thinking must be their own!

It is normal for a student not to be able to complete every problem on every worksheet. The process of interpreting, understanding, and trying different strategies is valuable in the attainment of mathematical power. Remember, no student is expected to know the answer to every problem.

Thank you for allowing your child to embark upon this mathematical adventure; the rewards should last a lifetime!

____signature

Parent/Guardian of____

☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆☆

After you have had a chance to review and use these materials, please take a moment to let us know if the **SUPERSTARS III** material has been useful to you. Your evaluation and feedback is important to us as we continue to work on additional curriculum materials. Please respond to:

Linda Patch
Mathematics & Science Section
NC Department of Public Instruction
301 N. Wilmington Street
Raleigh, NC 27601-2825

Indicate the extent to which you agree with statements 1-4.

	Strongly Disagree		Neither Agree nor Disagree		Strongly Agree
1. The materials will be helpful in teaching the mathematics goals and objectives set forth in the NC Standard Course of Study.	1	2	3	4	5
2. The materials are appropriate for the grade level indicated.	1	2	3	4	5
3. The problems are interesting and engaging for the students I teach.	1	2	3	4	5
4. The commentaries will encourage use of this material.	1	2	3	4	5

5. I plan to use these materials with my students in grade______.

6. Have you ever used earlier versions of the SUPERSTARS material? YES NO

7. How was this program implemented with your students?

8. Additional comments:

SUNSHINE MATH
Venus, I

*Name:*________________________
(This shows my own thinking.)

★★ 1. Sasha needs 🍎🍎🍎🍎🍎🍎🍎🍎🍎🍎🍎🍎🍎🍎🍎.

She has 🍎🍎🍎🍎🍎🍎🍎🍎.

How many more must she get?

Answer:__________ 🍎

★ 2. Five little 🐝 flying high.

Seven more come to sit nearby.

How many 🐝 in all?

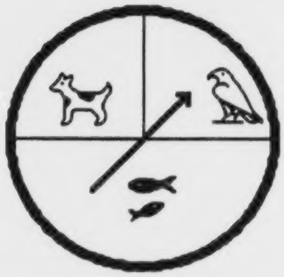
Answer:___________ 🐝 in all

★★★ 3. Amanda reads 2 books a week.

How many books does she read in 6 weeks?

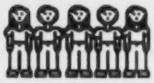
Answer: _____books

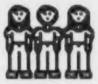
★★ 4. Julio will use the spinner to find out which pet his parents will buy. Which pet will he probably get? Circle it.

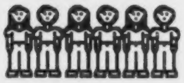


dog bird fish

★★ 5. Make a graph to show the birthdays. Draw a ● for each child.

September: 

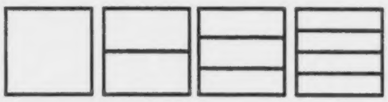
October: 

November: 

Fall Birthdays

September								
October								
November								

6. Draw the picture that comes next:

 ____________

Commentary

Venus, 1

1. **(7)** 15 – 8 = 7. Students might use cubes to represent the apples. Making up a story to go with the problem might help some students who have trouble. They are likely to solve the problem by *counting on*.

2. **(12)** 5 + 7 = 12. Manipulatives to represent the bugs, or drawing pictures of the bugs, will help some students.

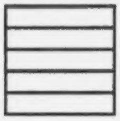
3. **(12)** 1st week-2 books, 2nd week-4 books, etc....6th week-12 books. Students who simply add or subtract the two numbers they see in the problem will need to act this out with real books and a calendar.

4. **(fish)** The problem is an intuitive introduction to probability. The chance is greater for getting a fish because fish take up more area of the circle. Some students unfamiliar with spinners may choose "bird" because that is where the arrow is pointing in the drawing.

5.

September	●●●●●
October	●●●
November	●●●●●●

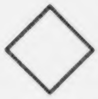
6. **(A square divided into 5 sections)** Be lenient with student's drawings. Some will have the right idea, but their small motor skills aren't developed enough to draw such a figure precisely. Have them describe their figure to you verbally, and give them credit if their description is correct.

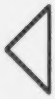


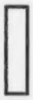
SUNSHINE MATH
Venus, II

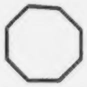
*Name:*__________________________
(This shows my own thinking.)

★★ 1. Which piece will make this shape if you have several of them? Circle your choice below.

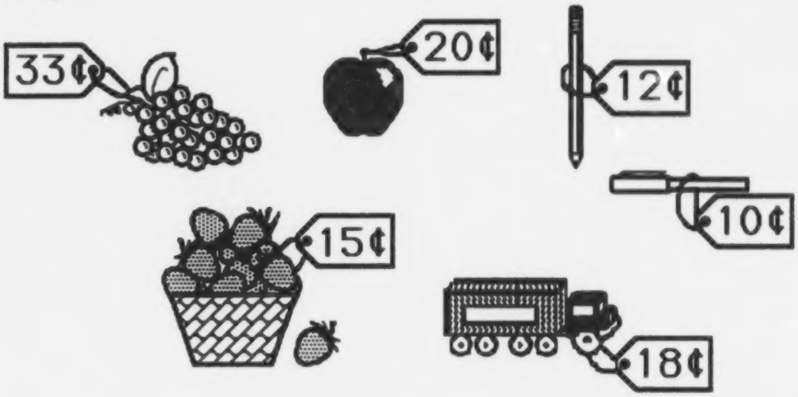



A.

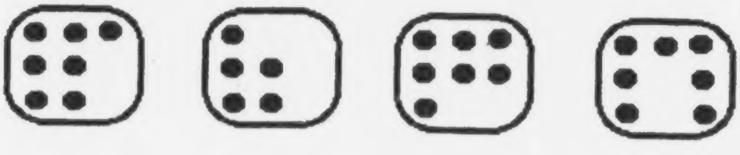

B.


C.

★★ 2. You spent exactly 33¢. Circle the two things that you bought.



★ 3. Which tile has a different number of dots than the other tiles? Circle the one that is different.



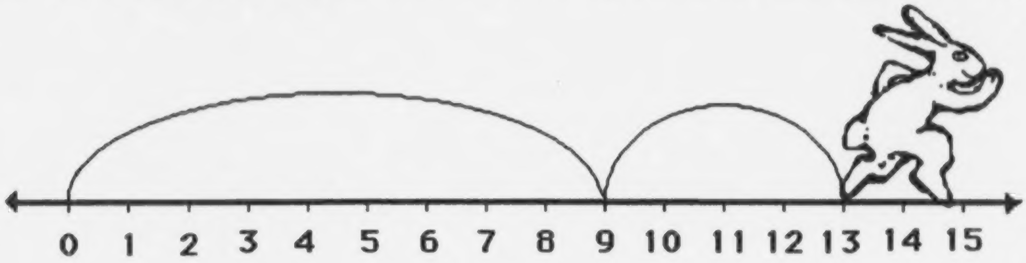
★★★ 4. Five scarecrows had a candy corn eating contest.

Ben ate the most candy corns.
Jen ate more than Len.
Jen ate less than Ken.
Zen ate less than Len.

Write the scarecrows' names in order to show how much candy corn they ate.

Answer: _______ ______ _______ ______ _______
most least

★5. Write a number sentence to show how far the rabbit jumped.



Answer: ___________________

★★★ 6. Find the mystery number.

Add me to myself.
Then add 2 more.
You will get 14.
Who am I?

Answer: The number is
____.

Commentary

Venus, II

1. **(A)** Students might want to cut out shapes like these and see if they can make them fit. Figure A is half of the square shape. The rectangle and hexagon will not fit the shape.

2. **(basket of berries and the truck)** 15¢ + 18¢ = 33¢.

3. **(Second Tile)** There are five dots on this tile. Each of the other tiles have seven dots.

4. **(Ben, Ken, Jen, Len, Zen)** Students might enjoy lining up like this themselves to act out the roles. Drawing a picture most-to-least will also help answer the question.

5. **(9 + 4 = 13)**

6. **(6)** Most students can *guess and check* to find the mystery number. Perhaps they would guess it was 5. When they go through the steps, they find that 5 is too small because they don't get 14. So they would revise their guess up. *Working backwards* might be appropriate for some students. In this case they start by reversing the last step -- what did they have before they added 2 and got 14? Then they need to determine what number can be added to itself and get 12?

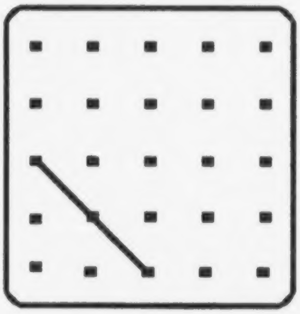
SUNSHINE MATH
Venus, III

*Name:*__________________________
(This shows my own thinking.)

★ 1. I am a number. Subtract me from 12 and get 9. Who am I?

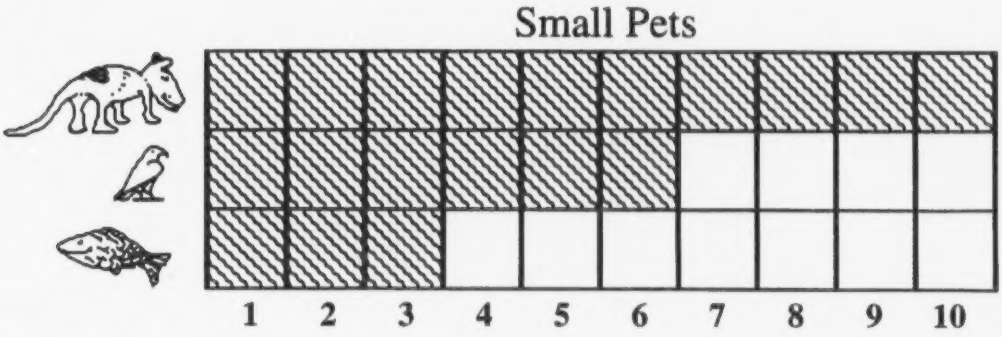
Answer:____________

★★★ 2. Draw a square in the box to the right. Begin with the part given.

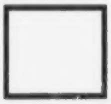
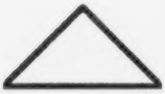
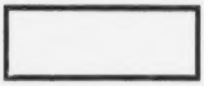
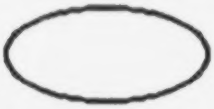


★★ 3. These are the favorite pets in a first grade class. How many more children liked dogs rather than birds and fish together?

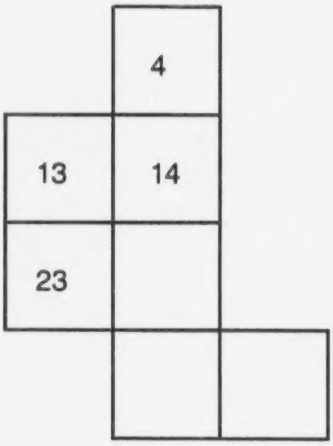
Answer: ____ more



★ 4. Four children each chose a shape. Jessica's shape is round. Jane's shape has 4 corners and 4 sides the same length. Scott's shape has 3 sides. Which shape did Mark choose? Circle it.

★★★ 5. Write the missing numbers in this part of the hundreds chart.



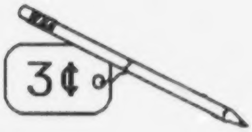
★★★★ 6. Use these digits: 1 9 3 6

What is the smallest 2-digit number you can make? ______

What is the greatest 2-digit number? ______

★★★ 7. Complete the table.

Number of pencils	1	2	3	4	5	6	7
Amount you pay	3¢						



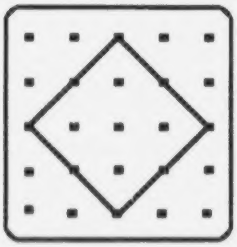
How much would 10 pencils cost? ________

Commentary

Venus, III

1. **(3)** This is a simple subtraction problem.

2. **(See the square to the right)** Students need to see all types of geometric figures that are not in the usual orientation. They need to know that figures remain the same -- squares, triangles, and so on -- when they are rotated.



3. **(1)** Students will enjoy making their own survey similar to this one and discussing the data. After they do so, this problem will be easy for them.

4. **(rectangle)** This may be the students' first introduction to the process of elimination. As they read each clue, they can write the name or initial on the shape. Then by process of elimination, the shape that is left must be Mark's.

5. This problem assumes that students have worked with a hundreds chart in class. If not, it would be necessary to introduce this to students before they attempt this problem. Based on the hundreds chart, the student will see that the numbers in each row are ten more than the numbers in the previous row.

	4	
13	14	
23	24	
	34	35

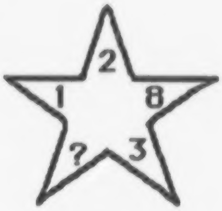
6. **(13 - Smallest; 96 - Greatest)** Students might enjoy taking only 2 digits at random from a stack of cards and making both the greatest and the smallest number possible with those two digits. They can play a game in which each child draws 2 such cards from a deck, and the teacher draws a card at random that says either "greatest" or "smallest." The child who wins that round gets to be the teacher on the next round.

7. **(6¢, 9¢, 12¢, 15¢, 18¢, 21¢; ... 30¢)** Students will fill in the chart according to the pattern of counting by threes, or they might just count by ones each time. The final answer -- the amount for 10 pencils -- requires that they go beyond the chart.

SUNSHINE MATH
Venus, IV

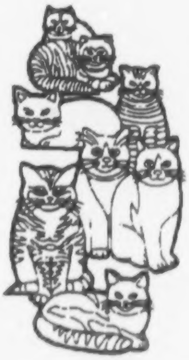
*Name:*__________________________
(This shows my own thinking.)

★★ 1. Superstar, what number is missing on the star so that the sum is 19?



Answer: _____

★★ 2. Look at the cats!

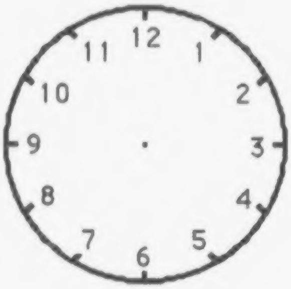


How many tails on all those cats? ____

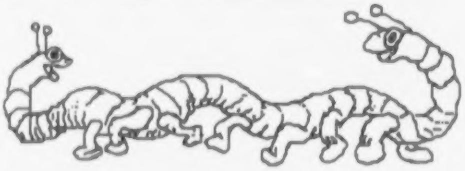
How many ears on all those cats?____

How many legs on all those cats?____

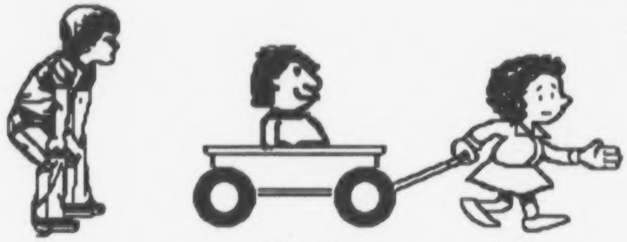
★★★ 3. Teaka finishes dinner at 6 o'clock. She reads her book for 2 hours. Then she goes to bed. Draw the hour and minute hands on the clock to show when Teaka goes to bed.



★★ 4. The bug below breaks in half every day. Each half becomes a new bug. If 5 bugs break apart, how many bugs will there be the next day? ______



★★★ 5. There are 3 children and 1 wagon. Two children can play at a time. One child can ride and one child can pull. In the table, show all the ways the children can ride and pull.

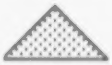


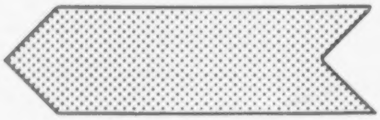
Child Pulling	Child Riding

★★ 6. Herick ran the ball for 5 yards. Then he ran for 3 more yards. Then he lost 2 yards on a run. His jersey number is 13. What was the net gain on those three plays?

Answer: ____ yards

★ 7. About how many triangles does it take to cover the big shape? Circle the best estimate.





5 triangles? 15 triangles? 30 triangles?

Commentary

Venus, IV

1. **(5)** Students will probably add 2 + 8 + 1+ 3 = 14 and then subtract 14 from 19 to get 5. Some will start with 19 and subtract 2,8,1, and 3 to get 5. Others may *guess and check.*

2. **(8; 16; 32)** Students can count the cats to decide how many tails, although not all the tails themselves are visible. They can also count the ears since they are visible. The challenge is to count the legs -- they are not visible, and a child will have to count four per cat.

3. **(8 o'clock)** If a student knows that the answer is 8:00 but doesn't know how to draw the clock hands, give him/her partial credit.

4. **(10)** This problem could be modeled by taking 5 pieces of paper, 1 per bug, and cutting them apart. An extension of this problem, which will come up in later years, is to consider what happens when those 10 bugs break in half, and then those 20, and so on.

5. **(The chart would be similar to that below.)**

Child Pulling	**Child Riding**
Alice	**Sam**
Alice	**Kevin**
Sam	**Alice**
Sam	**Kevin**
Kevin	**Alice**
Kevin	**Sam**

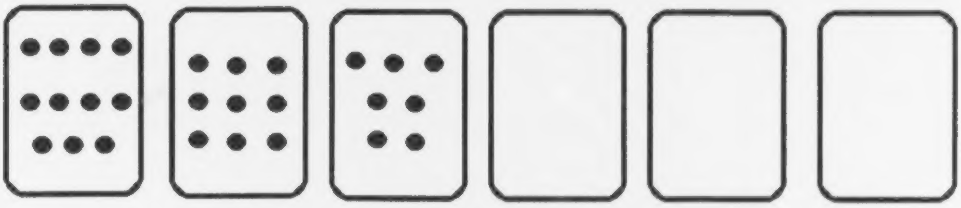
6. **(6)** The problem involves both adding and subtracting, and it also has extraneous information. The two positive runs are added, and the yardage lost is subtracted. The jersey number has nothing to do with it. Some students might not know what the terms mean if they are unfamiliar with football. It would profit those students to have a little about the game explained to them before they attempt the problem.

7. **(15)** Students can draw triangles in the large shape to cover it. Twelve triangles exactly fit, and this number is closer to 15 than to 5 or 30. A visual estimate should tell students that 5 is not enough, and 30 is too large a number.

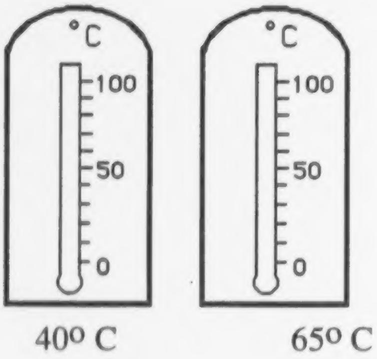
SUNSHINE MATH
Venus,V

*Name:*__________________________
(This shows my own thinking.)

★★★★1. Count the number of dots on each card. Find a pattern. Use the pattern to fill in the empty cards with dots.



★★ 2. Shade each thermometer to show the temperature given.

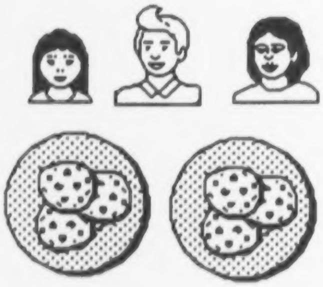


★ 3. Use + or - in each box to make the sentence true.

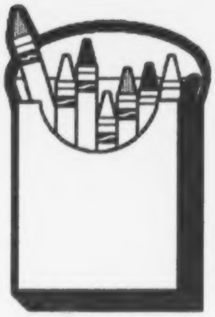
3 ☐ 4 ☐ 2 ☐ 6 = 11

★ 4. Three children divided the 6 cookies fairly. How many did each child get?

Answer: Each got ____ cookies

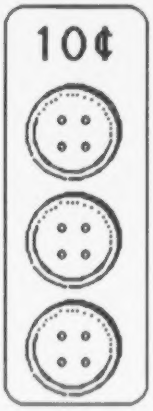


★★★ 5. If you took the crayons in the box and broke them in half, how many children could have something to color with?



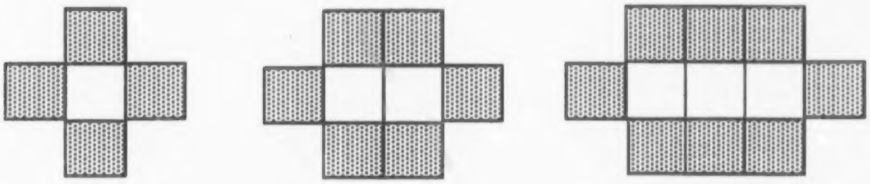
Answer: ____ children

★★★ 6. Tamika can buy 3 buttons for a dime. She needs 12 buttons for a project. How much will they cost?



Answer: ____¢

★★★★7. How many gray squares are needed to continue the pattern?



1 white square 4 gray squares	2 white squares 6 gray squares	3 white squares 8 gray squares	4 white squares ? gray squares

Answer: _______ gray squares

★★★ 8. (a) Name a body part that you have 2 of: _____

(b) Name a body part that you have 10 of: _____

(c) Name a body part that you have more than 100 of: _____

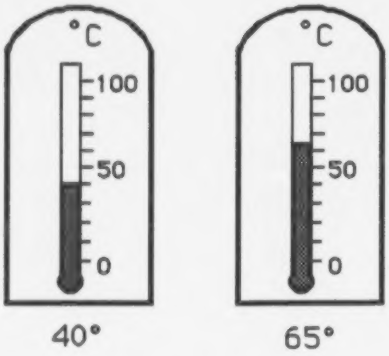
Commentary

Venus, V

1. **(5 dots, 3 dots, 1 dot)** The first box has 11 dots, the second has 9 dots, and the third has 7 dots. The pattern is then the odd numbers, counting backward from 11.

2. **(The marked thermometers are shown to the right.)** Each line on the thermometer represents 10 degrees, although this will not be obvious to all students. They may have to be prompted to see what number they count by -- *ten* -- starting with zero, to get to 50 at the 5th count. Practice in counting by tens should help. The second thermometer requires that they realize that 65 is half way between 60 and 70. As students practice counting by tens, this can be an extension.

   (Don't expect the children's marks on the thermometer to be precise.)



3. Students can *guess and check* with + and - to find the answer. Or, they might notice that + had to precede 6 since it's impossible to add the three previous numbers, subtract 6, and get 11. So the three numbers before 6 must turn out to be 5 once the computation is done for them. This makes the problem simpler.

$$3 \boxed{+} 4 \boxed{-} 2 \boxed{+} 6 = 11$$

4. **(2)** Fair shares is a good way for students to meet division before ever knowing how to perform the operation with numbers. The problem would be easy if the 6 cookies were grouped 2 to a plate, but here students will have to take one from both plates and give it to the middle person to divide them fairly. They might draw lines from each child to a different cookie, to show giving them out, and then draw a second line from each child to another cookie.

5. **(14)** Students can actually act out a problem like this, using paper instead of crayons.

6. **(40¢)** Drawing a picture of the cards with buttons on them will help students; four cards are required. Then they can label each card with 10¢ and count by tens to find the total.

7. **(10)** The pattern is that the white squares increase by 1 each time you move to the next figure --1, 2, 3, and so on -- and the grey squares increase by 2 each time -- 4, 6, 8, and so on. Therefore, the next number of grey squares would be 10. Some students might draw the next picture and actually count the grey squares to verify this answer. An extension of the problem would be to continue the pattern further.

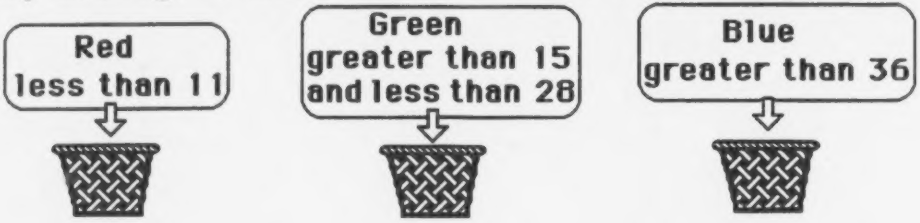
8. **(a. hands, feet, etc.; b. fingers or toes; c. hair)** The notion is for students to think about numbers that come naturally to them. Part (c) requires them to think about a large number, but one that is "real-world" to them.

SUNSHINE MATH
Venus, VI

*Name:*__________________________

(This shows my own thinking.)

★★★ 1. Color the numbers the same color as the baskets where they belong! What numbers are left without a color?


Red
less than 11
Green
greater than 15
and less than 28
Blue
greater than 36

17 10 39 5 3 31

42 26 20 48 34

29 19 2

Answer: ______________ do not belong in any basket.

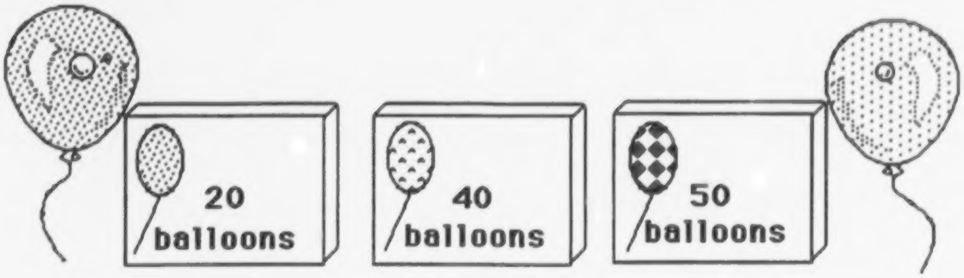
★★ 2. Quan has a dime.
He finds a nickel.
He buys a pear for 13¢.
How much money does he have left?

Answer: He has ____ left.

★★ 3. Find the number that goes in the box in part (a). Put it in the box for part (b). Write the answer to part (b) on the line.

a. 4 + ☐ = 7 b. ☐ + 8 = ____

★★★ 4. You are having a party. You will need 70 balloons. Circle the boxes you could buy to make 70.

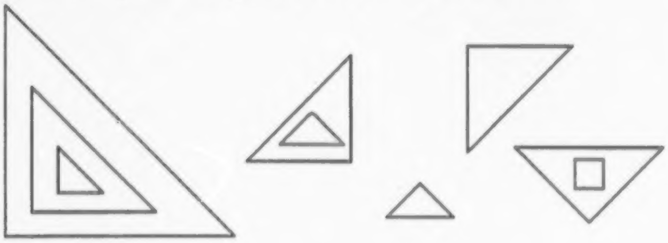

20 balloons
40 balloons
50 balloons

★ 5. You have 3 blocks. One is yellow, one is brown and one is green. Which block is green?

- The yellow block is in the middle.
- The brown block is on top.

Answer: The green block is __________.

★★ 6. How many triangles are there in all?



Answer:___________triangles

Commentary

Venus, VI

1.

Less than 11	**Greater than 15 less than 28**	**Greater than 36**	**Numbers that do not belong in any basket**
10, 3, 2, 5	**17, 26, 20, 19**	**39, 42, 48**	**29, 31, 34**

This problem will show which students have an intuitive feel for numbers that are greater than or less than other numbers. The middle basket requires that a number meet two conditions, and this will be new to many students. A help would be to indicate the "critical numbers" 11, 15, 28, and 36 on a number line, with a basket drawn under the set of numbers that match its conditions. This will provide a visual interpretation of the problem.

2. **(2¢)** Students should have an intuitive knowledge of a dime being 10¢, a nickel being 5¢, and the two together being 15¢. Subtracting 13¢ from 15¢ leaves 2¢.

3. ($\boxed{3}$, **11**) Students can subtract 4 from 7 to find the answer that belongs in the box, or they might find it simply by knowing that 3 is the number that added to four gives seven. In either case, 3 is then added to 8, giving 11.

4. **(20 and 50)** Students might find the boxes in a number of ways. They might start with the largest, 50, then *count on* by tens for the box of 20; they might simply add the numbers as 5 tens plus 2 tens, getting 7 tens or 70, or they might use a calculator and add 20 + 50.

5. **(on the bottom)** Taking out three blocks, labeling them with the 3 colors, and stacking them up according to the two conditions will help students who have trouble with this problem. One possible source of difficulty is that the symbols on the blocks (6, A, and P) are arbitrary, but some students will assume they have meaning in the problem.

6. **(8)** Students can count the concentric triangles, as well as the individual ones. Some will have trouble with the triangle with a square in it, feeling that this somehow is disallowed. Or, they might count the square, not distinguishing it from a triangle.

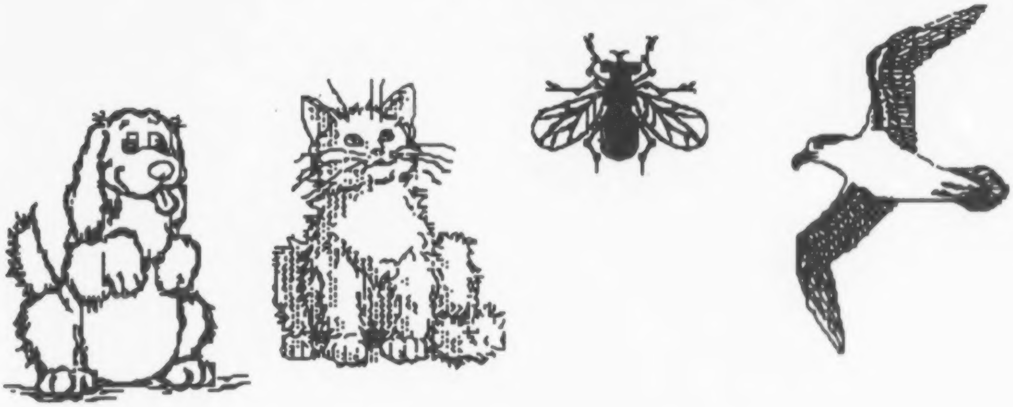
SUNSHINE MATH
Venus, VII

*Name:*__________________________
(This shows my own thinking.)

★★★★1. The dog ate 9 flies. The cat ate 3 more flies than the dog. The bird ate 2 more flies than the cat.

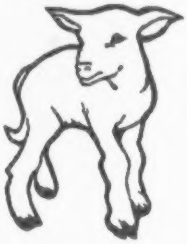
How many flies did the bird eat? _____

How many flies did all three animals eat? ______



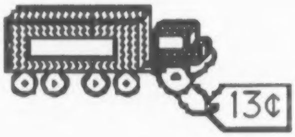
★★ 2. How many legs are on 5 lambs?

Answer: ____ legs

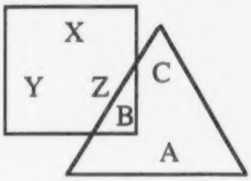


★★★ 3. How many trucks can you buy for 30¢?

Answer: ____ trucks



★ 4. Which letters are in the triangle?



Answer:______________

★★★ 5. I have 4 tens. My ones digit is 2 more than my tens digit. What number am I?

Answer: ________

★★ 6. Put a + or – in each circle to make a true sentence.

13 ○ 4 ○ 8 = 17

★★ 7. Tom has half as many pennies as Sue. Sue has 20 pennies. How many pennies does Tom have?

Answer: ____ pennies

Commentary

Venus, VII

1. **(14; 35)** If the dog ate 9 flies, then the cat ate 12 flies and the bird ate 14 flies. Together they ate 9 + 12 + 14 flies. This problem may be troublesome for children because they don't simply add or subtract the numbers that appear. It might be helpful if they act out the situation, using manipulatives, stressing the words *more than* in the problem.

2. **(20)** If one lamb has 4 legs, 2 lambs have 8 legs, and so on to 5 lambs having 20 legs. Students might draw stick figures of the lambs and count their legs as they draw them.

3. **(2)** If one truck costs 13¢, then 2 trucks cost 26¢. You can only buy 2 trucks for 30¢, and you'll have 4¢ left. A student might want to act this problem out with 30 pennies, putting down 13 for each purchase.

4. **(A, B, and C)** Since B belongs to the square and the triangle, it counts as belonging to the triangle.

5. **(46)** As 4 tens are 40, the *tens* place has a 4 in it and there is a 6 in the *ones* place. Students might enjoy doing some more "mystery number" games like this, giving a hint as to either the *ones* or *tens* digit first, then the other.

6. **(–, +)** Using trial and error, the student can put the correct symbols in the circle to make a true statement.

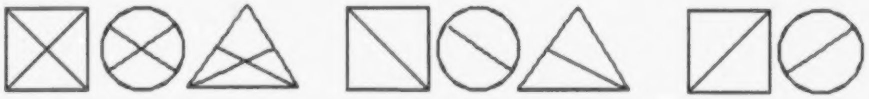
$$13 \ominus 4 \oplus 8 = 17$$

7. **(10)** Research is beginning to show that students coming to first grade already have intuitive knowledge of some fractions and "half" is one of those. They may not get this problem correct, but many can divide a collection of food or other such common objects among several children. In this case, two children could act out the roles, one starting with 20 pennies and the other with none. They would divide them by going "one for you, one for me," and so on.

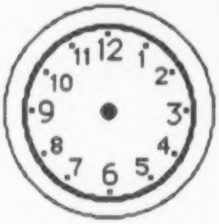
SUNSHINE MATH
Venus, VIII

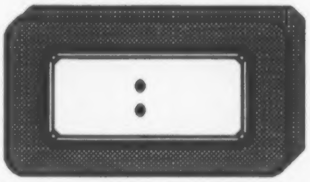
*Name:*__________________________
(This shows my own thinking.)

★★ 1. Draw the next figure in the pattern.

 ______

★★★★ 2. At one o'clock the team played soccer. One and a half hours later, the team left the field. Place the hour and minute hand on the clock to show when the team left the field. Or if you prefer, write the time they left on the digital clock.





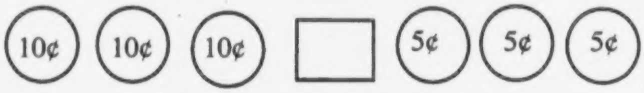
★★ 3. My sister earns 10¢ for making her bed. She wants to earn 50¢. How many times must she make her bed?

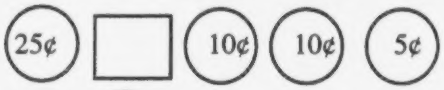
Answer: _____ times

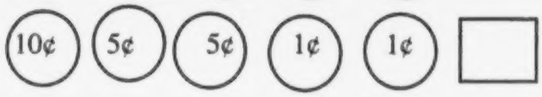
★★★ 4. If you write the numbers from 1 to 40, how many times would you write a 7?

Answer: _______ times

★★★ 5. Put *greater than* (>), *less than* (<), or *equal to* (=) in the box to compare each problem.

a. 

b. 

c.  $0.32

★ 6. How many days in December are after December 16?

Answer: ____ days

December						
Sun.	Mon.	Tues.	Wed.	Thur.	Fri.	Sat.
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

★★★ 7. Use the rule. Complete the table.

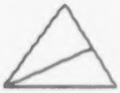
Rule: Out is 10 more than In

In	Out
5	15
7	☐
10	☐
21	☐

Commentary

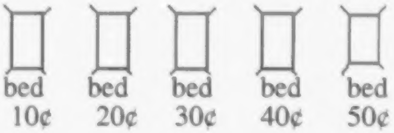
Venus, VIII

1. The outside figures which repeat are square, circle, then triangle. Also, there are two lines in the first set of three such figures, then one line slanting down from left to right in the second set, then one line slanting up from left to right in the third set. The last figure is shown to the right.



2. **(One clock should show 2:30 o'clock.)** In this problem students have a choice of the way they should answer. A student who knows both ways of recording time should receive an extra, bonus star.

3. **(5 times)** Students can draw a picture to solve the problem. They should be encouraged to count by tens also.



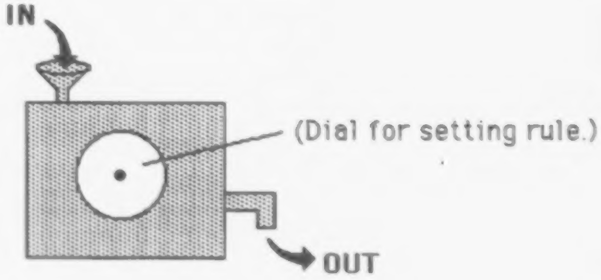
4. **(4)** Students could write all the numbers from 1 to 40, and select those with a 7. Some will be able to do this problem mentally, by thinking 7, 17, 27, 37 and perhaps by counting out loud.

5. **(a. > b. = c. <)** Most students will be able to add the amounts of money on each side mentally. If not, they can use a calculator. The difficult part, but an important part, is for them to write down or remember what sum they get for each side. When they have computed the amount on both sides, they can compare them.

6. **(15)** Counting all the days from December 17 to 31 is the most likely way that students will find this answer. A calendar presents a lot of patterns for students to discover and can be useful in other math activities.

7. **(17, 20, 31)** It is interesting and instructive for students to see a model of a function machine. This problem illlustrates one type of function machine. They will enjoy having a physical model of such a machine, as shown below, with a dial that really turns. Then they can play a game with each other. One makes up a rule (the rule setter) and "sets the dial," and the other gives **In** numbers. The rule setter then gives the **Out** number, and they record this on a chart. After the rule is discovered, the roles are reversed.

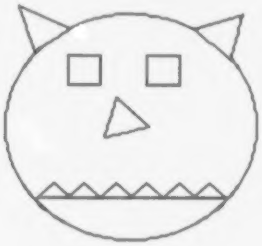
For an extension of this situation, once the rule is discovered, have the student give an **Out** number, and have the other student try to decide what number went **In**. Do not stress reversing the rule -- allow them to decide on the **In** number simply by intuition.



SUNSHINE MATH
Venus, IX

*Name:*__________________________
(This shows my own thinking.)

★★★★ 1. Wooden faces are made in a factory. The cost of making each shape is shown below. How much does it cost to make this face?

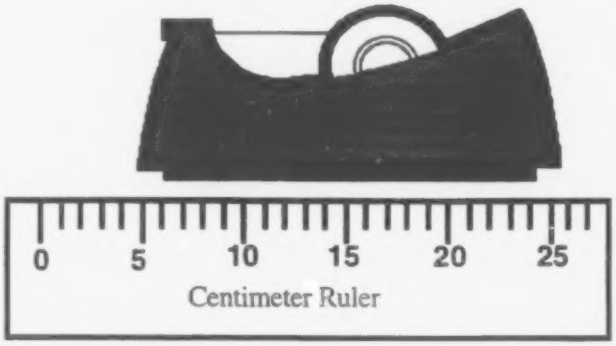


Any triangle costs 3¢
Any square costs 5¢
Any circle costs 6¢

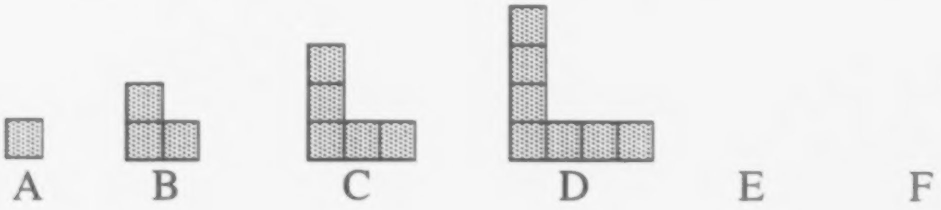
Answer: _____ ¢

★★ 2. Lourdes said the tape dispenser was 25 centimeters long, but he did not start measuring at zero. How long is it?

Answer: ___ centimeters



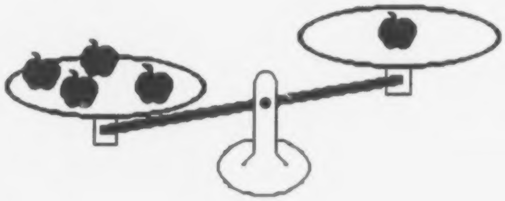
★★ 3. Follow the pattern. How many squares do you need to make E? ____ How many to make F? ____



★ 4. I am thinking of a number. When you subtract 6 from the number, you get 13. What is my number?

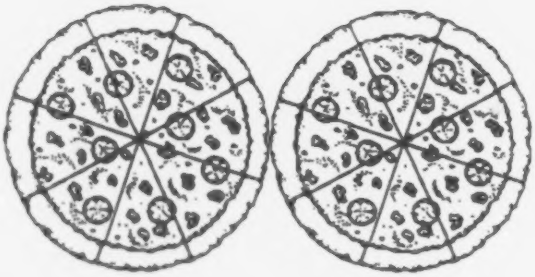
Answer: ________

★ 5. Draw in enough apples to balance the scale.



★★★ 6. Four children divided the 2 pizzas in a fair way. How many pieces did each get?

Answer: _____



★★ 7. Write all the 2-digit numbers you can make with these cards:

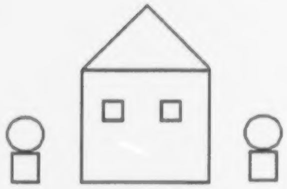
4	8	6	5

Write them in this box:

Commentary

Venus, IX

1. **(43¢)** The ears, nose, and teeth are 9 triangles which cost 27¢. The two eyes are squares and cost 10¢. The face itself costs 6¢. Students might practice this problem with a different design, such as the house and two bushes to the right.



2. **(20 or 21 cm)** Students will solve this in different ways. Some will count by ones from 4 (or perhaps 4 1/2) up to 25. Some might count by ones, starting at 25 and working down to 4 at the other end. Others will mark the length of the tape dispenser on a piece of paper or another object, hold that distance up to zero on the scale, and read the other end. Others will count backwards (25, 24, 23, ...) down to 4, but then they may not know the answer unless they know how many times they counted. A few might subtract 4 from 25.

3. **(9, 11)** Students might practice making patterns like these out of tiles, cubes, or other manipulatives. A prompt might be to ask students having difficulty with such problems: "How do you get from step 1 to step 2? How do you get from step 2 to step 3?" This will encourage them to relate each figure to the one which immediately follows or precedes it. Students who are unfamiliar with patterns might have trouble focusing on the parts of the pattern and look globally at the design instead.

4. **(19)** Students might *guess-check-revise* for this problem. That is, they might try a number like 10 to start and see if they get 13 after subtracting 6. They then revise their guess accordingly.

5. **(3)** To balance the scale, the student has to draw three apples on the right side of the scale. A key to solving such problems is some familiarity with balance scales in the classroom, knowing that the same weight must be on both pans for the bar to be horizontal. This model is important for later work with Superstars since a balanced scale is a physical embodiment of the equation concept used in mathematics.

6. **(4)** Students will approach this problem in different ways. Some will count out individual pieces, one at a time, for the 4 children until all of the pieces are gone. Others will divide each pizza into four equal parts, so that each child will get 2 pieces from each pizza for a total of four. Still others might think initially that 2 children can share one pizza and cut each pizza in half and giving 4 adjoining pieces to each child.

7. **(48, 46, 45, 86, 85, 84, 65, 68, 64, 56, 58, 54)** At first, students might practice this problem with only 3 cards and numbers different from the ones given.

SUNSHINE MATH
Venus, X

*Name:*________________________
(This shows my own thinking.)

★ 1. Jill and five friends are having a party. Each person wants 2 cupcakes. How many cupcakes will they need?

Answer: ______ cupcakes

★★★ 2. Below are 5 coins with the faces covered up. The coins are worth 42¢ in all. What coins are they? Write the value in cents on each coin.

○ ○ ○ ○ ○

★★ 3. March has 31 days. If March 1 is a Thursday, what day of the week is the last day of the month?

Answer: __________

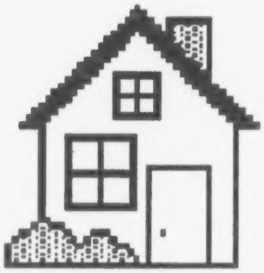
MARCH						
Sun	Mon	Tue	Wed	Thu	Fri	Sat

★ 4. The Kindergarten had 24 children, then four more joined the class. The first grade had 23 children, then six more joined the class. Which class has more children now?

Answer:_______________

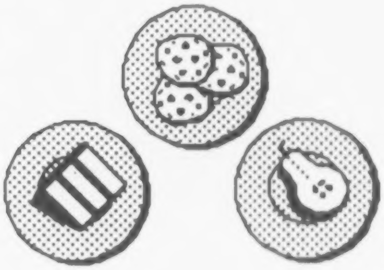
★★ 5. How many squares are in the picture of the house?

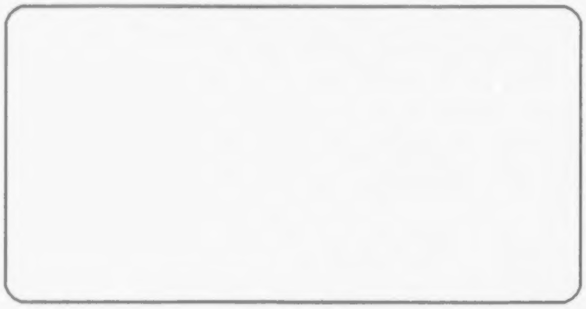
Answer: _____



★★★ 6. You are planning a party. You want to fit as many plates of dessert on the table as you can. About how many of the plates would fit?

Answer: _______ plates



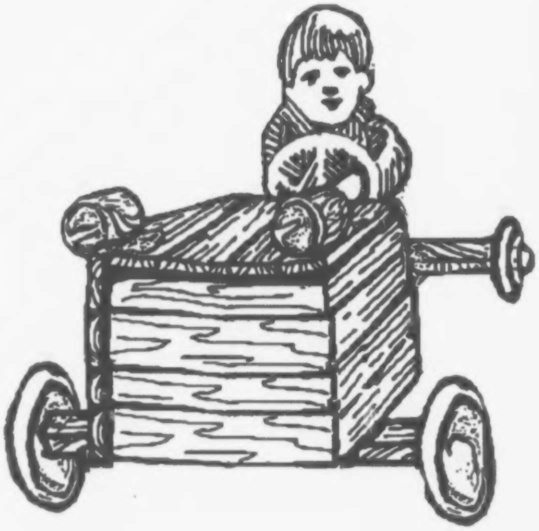


★★ 7. If you and two friends wanted to each build a car like this, how many wheels would you need?

Answer: ______

How many tin cans would you need for lights?

Answer: ______



Commentary

Venus, X

1. **(12)** Students need to include Jill with her five friends to make six children. Drawing a picture of each child, and 2 cupcakes per child, will help find the answer by counting.

2. **(25¢, 10¢, 5¢, 1¢, 1¢)** A good strategy is for students to start with the largest coin possible for the given information and work from that. In this case, start with a quarter because 2 quarters is too much. Then add a dime -- two dimes are too much. Continue in this fashion.

3. **(Saturday)** If students are unfamiliar with a calendar, they might not know to place a 1 in the box under Thursday, a 2 in the next box, and so on. Practice problems like this could involve looking at a real calendar for the present month and discussing questions similar to these to familiarize a child with the calendar set up.

4. **(First grade)** The Kindergarten class has 28 students, while the first grade class has 29 students.

5. **(10 squares)** Each window pane is a small square, and the window frame itself counts also. Therefore each window actually has 5 squares showing. The two windows together would therefore have 10 squares.

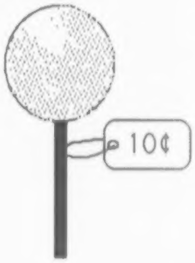
6. **(Accept any answer from 7 to 9)** Students with good visual estimation skills or accurate drawing skills might find a reasonable answer without using a real object such as a plate. A nickel is about the same size as one of the plates shown; therefore, a nickel can be used repeatedly to get a good estimate.

7. **(12; 6)** Some students will forget to count the fourth wheel on the car, because it can't be seen. Other common mistakes are to fail to count the two friends, or to count the two friends but not yourself. This problem involves a concrete example of ratio -- 4 wheels to each car; 2 headlights to each car. Similar problems would involve considering a real car and additional ratios -- seat belts, air bags, radio speakers, and so on. Other transportation objects offer more possibilities -- bicycles, big wheels, wagons, skates, etc. **If students count the steering wheels, accept 15 as the correct answer for the wheels!**

SUNSHINE MATH
Venus, XI

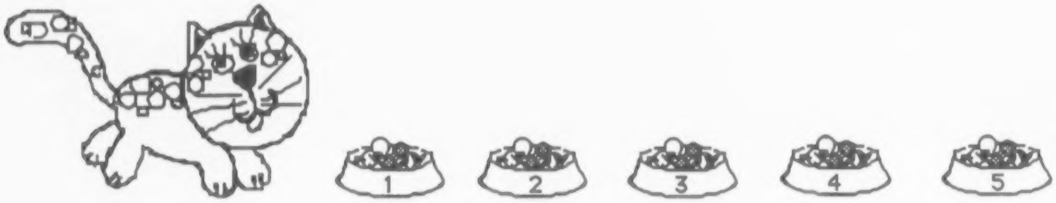
*Name:*________________________
(This shows my own thinking.)

★★ 1. How much change should you get if you paid with a quarter?



Answer: ____

★★★ 2. It takes 6 kitten steps to walk to the first bowl. It takes 4 steps to walk from one bowl to the next bowl. How many steps does it take for kitty to walk from where he is to bowl 5?

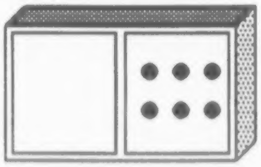


Answer: _______ kitten steps

★ 3. Jessica is in line. Three girls are in front of her. 5 girls are in back of her. How many girls are in the line?

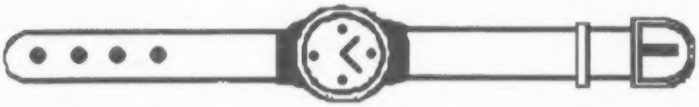
______ girls

★ 4. Make the domino a double. Write an addition sentence for the double domino.



Answer: ____ + ____ = _____

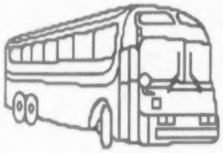
★★ 5. About how many paper clips would it take to measure the length of the watch?



Answer: _________ paper clips

★ 6. Use mental math.

24 children are on the bus.
3 more got on.
2 got off.
1 more got on.
How many children are on the bus now?



Answer: _______________ children

★★ 7. Do each step in the flowchart. Write your answer in the empty box.

$$\boxed{\$4} \xrightarrow{+} \boxed{\$3} \xrightarrow{-} \boxed{\$2} \xrightarrow{+} \boxed{\$1} \xrightarrow{=} \boxed{}$$

★★★ 8. Find the number that goes in the first step of the flowchart. Write it in the empty box.

$$\boxed{} \xrightarrow{+} \boxed{\$1} \xrightarrow{-} \boxed{\$5} \xrightarrow{+} \boxed{\$2} \xrightarrow{=} \boxed{\$4}$$

Commentary

Venus, XI

1. **(15¢)** Some students may give the answer as coins instead of as 15¢. They may say they would get back a dime and a nickel, or 15 pennies, or some other combination. Students who have trouble with this problem might want to play a game with a partner. One could be the clerk and hand over the change; then they switch roles. The clerk would start by counting back the change a penny at a time and then move to other coins.

2. **(22)** 6 + 4 + 4 + 4 + 4 gives 22 steps. Walking off the paces is an active way of getting the answer. Students might also draw a diagram with each step marked off.

3. **(9)** The key point that some students will overlook is that Jessica must also be counted. Making a "stick figure" diagram helps students see Jessica also.

4. **(6 + 6 = 12)** Students need to draw in 6 dots to make the domino a double. Then 6 + 6 = 12 is the addition sentence.

5. **(3 or 4)** An answer can be obtained by visually marking off the length of a paper clip several times in a chain, or by measuring it and marking it off accurately.

6. **(26)** Students can *count on* and *count back* to find the answer mentally. Some students will be troubled by the way the problem is set up (showing the single digits 3, 2, and 1 lined up under the tens digit of 24). They might be tempted to combine the digits that are lined up, rather than considering the numbers in context. Acting out the problem should help.

7. **($6)** This problem leads into the next one, problem 8. Hopefully students have previously encountered a sequence of steps to be followed to solve a problem -- a flowchart is simply a way to visualize those steps. Students who have trouble might go through the steps with play money.

8. **(6)** This problem reverses the thinking pattern of the problem above, number 7. In this one, students are asked for the starting number so that, after the steps are followed, they get the end result stated. There are generally two approaches to this type of problem -- *guess-check-revise* to find the starting number, or *work backwards* by reversing the steps. If this is their first encounter with such a problem, *guess-check-revise* is the best approach. Students are encouraged to simply guess a starting number and do the computation. If they don't get the indicated answer, they could guess a higher or lower starting number because of what they learned. They keep *guessing-checking-revising* until they are successful.

SUNSHINE MATH
Venus, XII

*Name:*__________________________
(This shows my own thinking.)

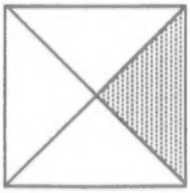
★★★★ 1. Look at the pattern.

✂ ☎ ✈ ✂ ☎ ✈ ✂ ☎ ✈ ....

Draw or name the 10th figure in the pattern: ______

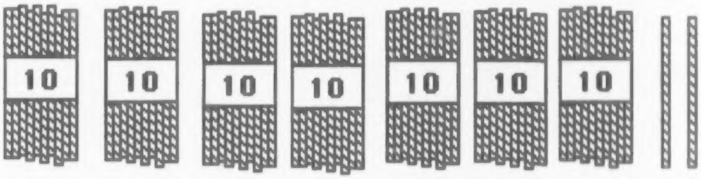
Draw or name the 14th figure in the pattern: ______

★★ 2. Circle the name of the shaded part of the square.



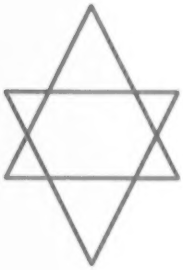
A. one-third
C. three-fourths
B. one-fourth
D. four-fourths

★ 3. How many straws are shown below? ______

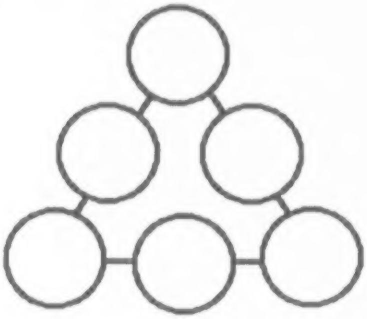


★★4. How many different triangles are there in the figure to the right?

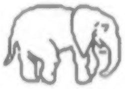
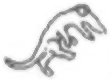
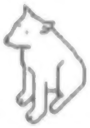
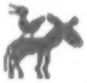
Answer: ____ triangles

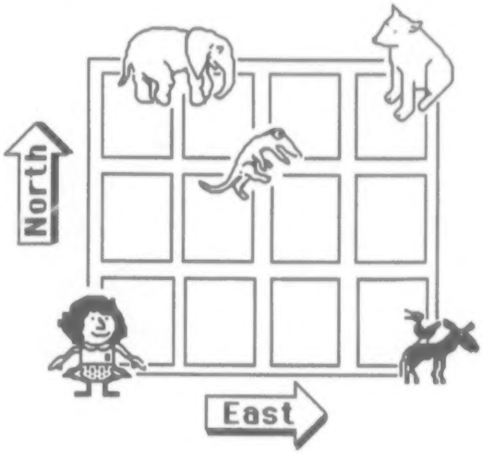


★★★5. Place the numbers 1, 2, 3, 4, 5, and 6 in the circles so that the sum along each side is 10.

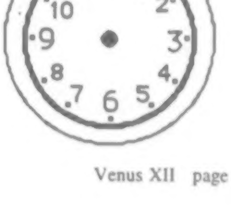


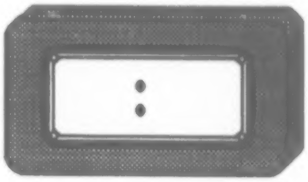
★★★ 6. Help the girl get from her spot at the zoo to each of the animals. Tell her how many blocks EAST to go and then how many blocks NORTH.

- **To get to**  **go 1 East and 3 North.**
- **To get to**  **go**
  ___ East and ___ North.
- **To get to**  **go**
  ___ East and ___ North.
- **To get to**  **go**
  ___ East and ___ North.



★★★★ 7. Alberto gets up at 6:30 a.m. Three hours later he goes to the library. One and a half hours after that he eats lunch. Show the time he eats lunch on both clocks.





Commentary

Venus, XII

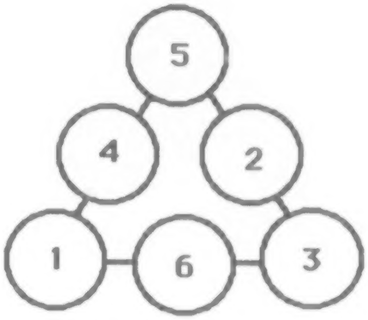
1. **(scissors, phone)** The pattern is repeated after every third term. The 10th figure is called for because it is the next one not shown. The 14th term is then called for as this encourages students to predict "down the line" what might appear. Students will enjoy making up such patterns of their own and using them with other students.

2. **(B)** One out of four equal parts of the square is shaded. Most students will not have encountered these names in their formal schooling yet, but some will have an intuitive notion of the word names for these simple fractions.

3. **(72)** Counting by tens produces 7 tens; then add 2 ones and get 72. In experiences leading to this, the tens and ones should be "mixed up" from left to right. Then the child has to sort out the tens and ones based on their size rather than the way someone has already grouped them as is displayed here.

4. **(8)** There are 6 small triangles around the edges and then the two large triangles themselves. The purpose of this problem and similar ones is for students to see both the overall structure of a design and also the small parts that make it up.

5. **(One solution shown to the right.)** Try a *guess and check* strategy. Try 6 numbers in different places until you find the combination that works. Be sure the sum along each side is 6. A hint might be that the 5 and 6 need to be "separated."



6. **(2, 2; 4, 3; 4, 0)** This problem is an introduction to the Cartesian Coordinate system. It is important that students remember to go east first, then north. Although this is merely a convention, it is an important one to keep in mind.

7. **(11:00)** Showing time on clocks will be new for some students but not for others. Students are asked to respond using both types of common clocks. The time increments in the problem are limited to "half hours" so that students can intuitively add the time periods.

SUNSHINE MATH
Venus, XIII

*Name:*________________________
(This shows my own thinking.)

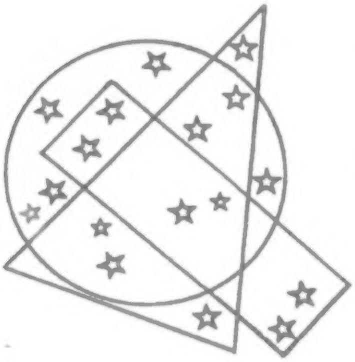
★★★ 1. Use the chart. Find the value of each word.

A→1¢	B→2¢	C→3¢	D→4¢	E→5¢	F→6¢
G→7¢	H→8¢	I→9¢	J→10¢	K→11¢	L→12¢
M→13¢	N→14¢	O→15¢	P→16¢	Q→17¢	R→18¢
S→19¢	T→20¢	U→21¢	V→22¢	W→23¢	X→24¢
Y→25¢	Z→26¢				

BALL = 2¢ + 1¢ + 12¢ + 12¢ = 27¢

JUMP ROPE =___ QUILT = ___ Your first name = ____

★★★ 2.

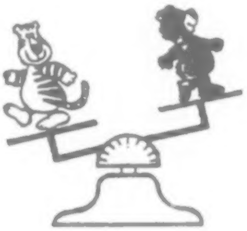


A. How many stars are there in the triangle? ____ stars

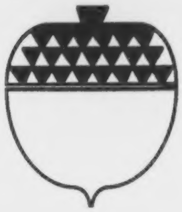
B. How many stars are in the circle? ____ stars

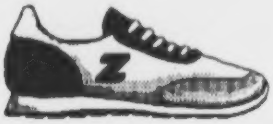
C. How many stars are in the rectangle? ____ stars

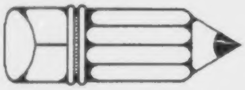
★ 3. Circle the animal that weighs more.



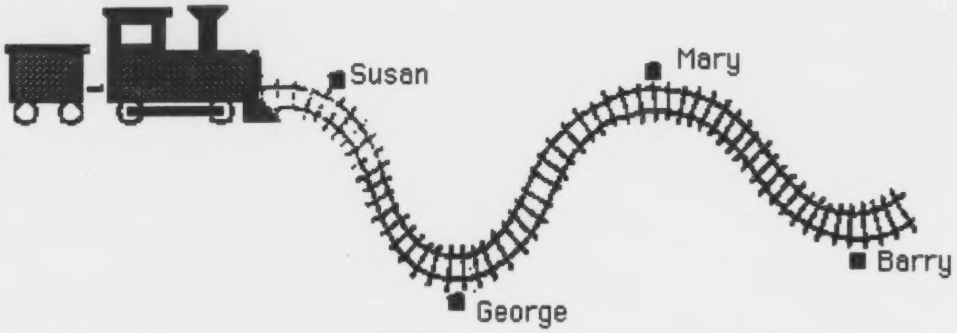
★★ 4. Two pictures below can be folded so that the two halves match. The other picture can't be folded to match. Color the two that can be folded to match.







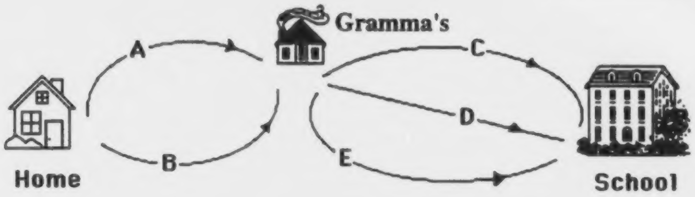
★★5. Jan has a toy train. She placed George's house 2 meters from Susan's house. Estimate how far it is from George's house to Barry's house. Circle the answer.



A. 8 meters B. 6 meters C. 4 meters

★★★★ 6. Ramon stops by his Gramma's house each day on his way to school. He has 2 ways to walk to his Gramma's house. He has 3 ways to walk from there to school. How many ways can he travel from his house to school?

______ways



Commentary

Venus, XIII

1. **(Jump Rope = 114¢, Quilt = 79¢, answers will vary)** Students will enjoy adding the values of certain familiar words as practice for this problem. They will enjoy seeing whose name "costs the most," whose name "costs the least," and so on. Note that some students may interpret "Your first name" as finding the value of those three words, which is 184¢.

2. **(A. 8; B. 13; C. 6)** Students need to count all the stars in the given shapes. This is a Venn diagram-type problem.

3. **(Tiger)** The tiger weighs more than the bear because his side of the scale is lower. A balance scale will be used in many problems in Superstars in the years to come as it provides a physical model of an equation.

4. **(The ornament and pencil.)** This problem involves symmetry. The ornament has a vertical line of symmetry, and the pencil has a horizontal line of symmetry. It is interesting to see if students color one of these two but not the other, i.e., do they more easily see one type of line of symmetry than the other type?

5. **(C: 4 meters)** Visual estimation is the key to success with this problem. If it is 2 meters from Susan's to George's house, then it is about that same distance from George's to Mary's and from Mary's to Barry's. So it is about 4 meters from George's to Barry's house.

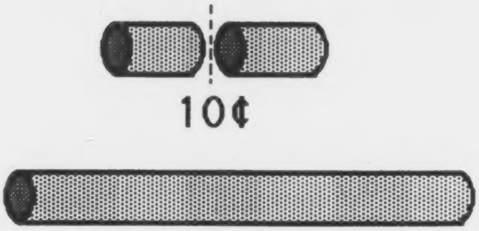
6. **(6)** Students who have trouble with this problem can approach it in one of several ways. The way used most often is simply to trace the paths with their finger, trying to count them as they go. Hopefully they will try an organized approach to this problem, such as using only path A and counting the number of ways there are, then moving to B and counting the number of ways there are. Students might try making an organized list, such as: AC, AD, AE, BC, BD, BE.

SUNSHINE MATH
Venus, XIV

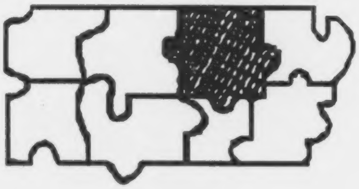
*Name:*________________________
(This shows my own thinking.)

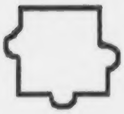
★★★★ 1. If it costs 10¢ to make 1 cut, how much does it cost to cut a log into 5 pieces?

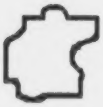
Answer: ____¢

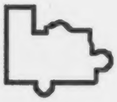


★ 2. Look at the puzzle below, then circle the piece that will fit in the shaded area.



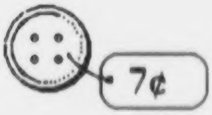

A

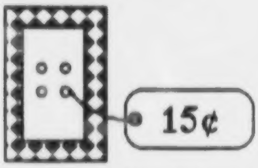

B

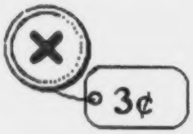

C

★★ 3. Circle the type of button that Keisha bought.

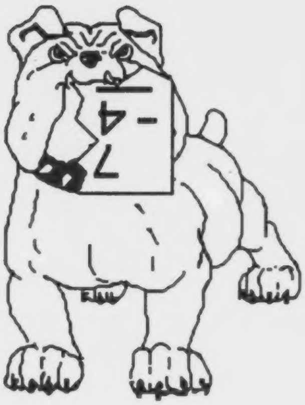
The button costs more than a nickel, but the button costs less than a dime.







★ 4. Bozo chewed a hole in Lu's homework. He chewed the numbers in the ones place and the whole answer. Circle the best *estimate* of the answer to the problem you can see.

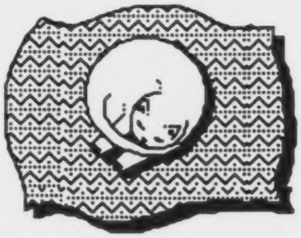


- about 110
- about 60
- about 30

★★ 5. It takes 50 stars to make an American flag. If you laid 50 stars out in rows with 10 stars in each row, how many rows would you have?

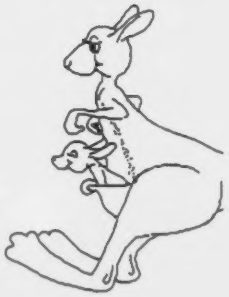
Answer: ____ rows

★★ 6. A cat is asleep on a mat at a pet store. About how many curled-up cats can sleep on this mat at one time?



Answer: about ____ cats

★★ 7. A kangaroo's tail is about as long as the kangaroo is tall. Draw the right size tail on this kangaroo.



Commentary

Venus, XIV

1. **(40¢)** It will help students to draw a diagram. Each cut is 10¢, but it takes 1 less cut than the number of pieces needed. Five pieces will take 4 cuts, giving 40¢ for the cost. Students might enjoy acting out this problem or similar ones by cutting a piece of string.

2. **(A)** Students with good visual discrimination skills will have no trouble with this problem. Others might choose to trace over the cut-out area, cut it out, and see which one it fits.

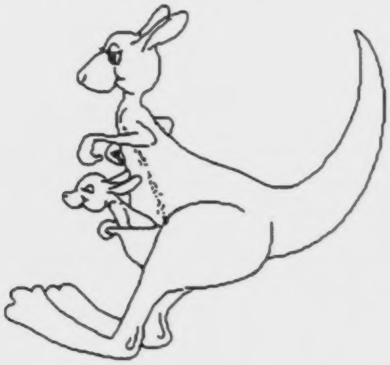
3. **(7¢)** The problem involves the concepts of *greater than* and *less than* in one problem. In this case, the words are used naturally with coins. This should be more meaningful to students than if the words were used simply with numbers. Similar problems used in the classroom will help develop this skill in a natural way before it is met in a more formal setting with symbols > and <.

4. **(about 30)** The students can see only "7 - 4", but they know that this means "seventy-something minus forty-something." The answer to that is "about thirty-something."

5. **(5)** For this problem, students might actually lay out rows of 10 stars each until they have 50 stars or make such a drawing. Given this information and the picture showing the 13 stripes, students will enjoy drawing an American flag,

6. **(2-4)** Answers will vary, but this range is appropriate. Some students might want to take a coin about the size of the cat and move it around the mat to get an estimate.

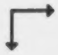
7. **(Use your judgment.)** The tail should not be real short or real long. Anything that is reasonable should earn credit. The actual picture from which this drawing was taken is shown below. Notice that the tail does not look quite as long as the height of the kangaroo, but that may be because of the curl in the tail.



SUNSHINE MATH
Venus, XV

*Name:*________________________
(This shows my own thinking.)

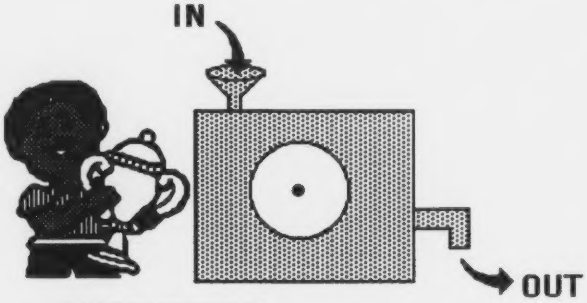
★★ 1. Draw a rectangle. Make it 3 centimeters wide and 7 centimeters long. Start at the corner below.



★★ 2. An ant walked around the outside of your rectangle above. How many centimeters did it walk?

Answer: The ant walked ____ centimeters.

★★★ 3. Kareem won a prize for making a number machine. He puts a number into the machine. Another number comes out. The number that comes out depends on how the dial is set.



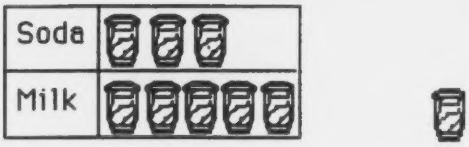
Fill in the table. Show the numbers that come out or go in. The setting is *subtract 7*:

In	Out
11	4
15	
19	
	20

★ 4. Richard has 3 dimes, a nickel, and 3 pennies. He buys a pencil for 26¢. Does he have enough left to buy an eraser for 10¢?

Answer: ______ (yes or no)

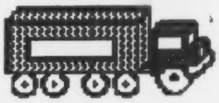
★★★ 5. How many more cups of milk than soda are there?



stands for 2 cups.

Answer: _____ more cups of milk

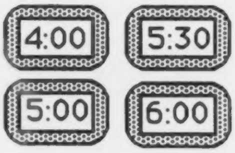
★ 6. Sally has 4 red trucks. She also has 2 yellow trucks, 2 blue trucks, and 1 purple truck. How many trucks does Sally have in all?



Answer: _________ trucks

★★ 7. What time is soccer practice? Circle the right clock.

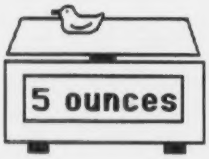
It is after 4 o'clock.
It is before 6 o'clock
It is not 5 o'clock.

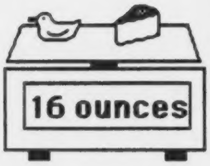


★★★ 8. There are 4 classrooms. 26 children are in each classroom. How many children in all 4 classrooms?

Answer: ________ children

★★ 9. How much does the piece of cake weigh by itself?





Answer: ___ ounces

Commentary

Venus, XV

1. **(Check rectangle drawn on paper.)** The first problem is to encourage students to draw a rectangle of a certain size enabling them to find the perimeter in the next problem. Some students will not know what a rectangle is, and others might not know how to measure with a ruler yet. For the latter student, encourage them to use a "centimeter cube" or some other device that can be used repeatedly as a single unit to measure distances.

2. **(20)** This problem gives an intuitive introduction to *perimeter* although the word should not be introduced as yet. Students can find the answer by counting 3 + 7 + 3 + 7.

3. **(Out: 8; Out: 12; In: 27)** Students are introduced to a function machine in this problem. They will enjoy having a machine like this in class. It can be made from an old box with a plastic lid for a dial and a funnel for the "In" chute. Students can pretend to "set the dial" for each other and fill in a chart to see who can guess what the dial is set to do. In the first two parts of this chart, they subtract 7 from the input number. In the last entry, they must decide what input number produces the output of 20.

4. **(yes)** Richard has 38¢. If he spends 10¢, he'll have 12¢ left, enough for the 10¢ eraser. Some students might have trouble with this problem if they don't know the value of coins and can't find the initial amount of 38¢.

5. **(4)** This is the first introduction that students have in *Superstars III* to a pictograph in which the symbol stands for a number other than 1. Some students will find the total for both milk and soda and subtract 6 from 10. Others will note visually that there are 2 more symbols beside milk, each representing 2 cups, and get 4 cups that way.

6. **(9)** This is a simple addition problem. Students might make a mark for each truck and count, or they might add the numbers they see in the problem.

7. **(5:30)** The problem involves *process of elimination*. The first and second clues eliminate 4:00 and 6:00 respectively. The last clue eliminates 5:00, leaving 5:30 as the correct answer.

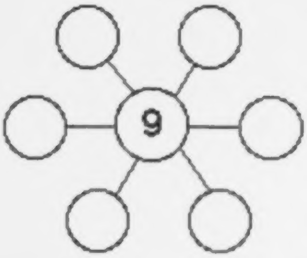
8. **(104)** Students will solve this by adding 26 four times. A calculator should be encouraged.

9. **(11)** Students must use visual clues to see that the duck weighs 5 ounces and that the duck and cake together weigh 16ounces. Therefore the cake alone weighs 16 - 5 or 11 ounces. Students will enjoy making up problems such as this for each other.

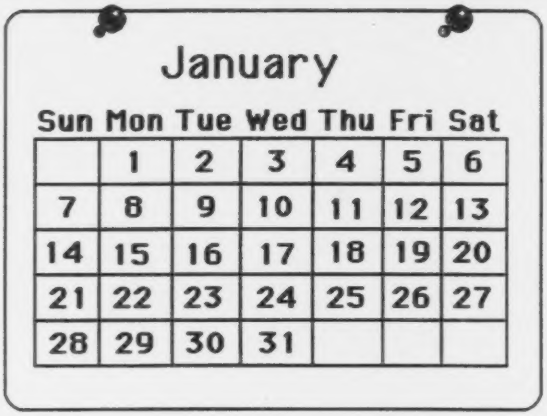
SUNSHINE MATH
Venus, XVI

Name: ______________________________
(This shows my own thinking.)

★★★ 1. Put 2, 3, 4, 6, 7 and 8 in the circles so that the sum along each line is 19. Use each number just once.



★★★ 2. Use the calendar to answer the questions.



January

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

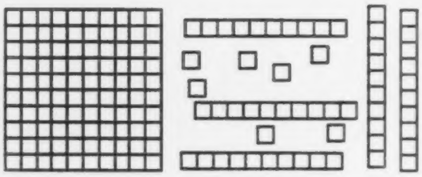
What date is the second Wednesday of the month?
Answer: ______

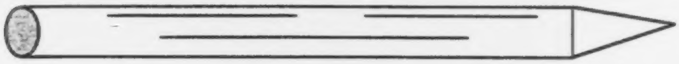
How many Saturdays are in January?
Answer: ______

What date is two days before the fourth Thursday?
Answer: ______

★ 3. What numeral do the number blocks show?

Answer: ____

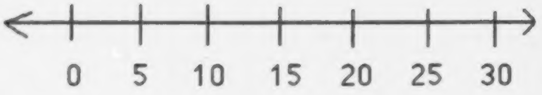




★ 4. Draw a pencil that is 3 centimeters shorter than the one above:

Draw it here:

★★ 5. On a number line,



a. is 13 closer to 10 or 20?
Answer: _____

b. is 28 closer to 20 or 30?
Answer: _____

★★★★ 6. Use the picture graph about a class to answer the questions.

Our Favorite Subject	
art	☯❀❀❀
music	☯☯❀❀
reading	☯☯❀
math	☯❀❀

key: ☯ = 2 boys
❀ = 2 girls

How many people like art best?

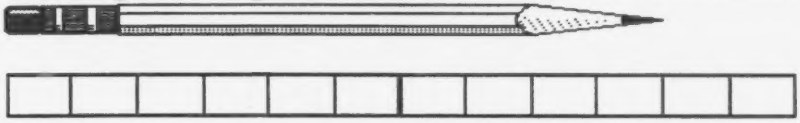
Answer: ____

How many more people like music than reading?
Answer: ____

How many boys and how many girls are in the class?

Answer: ___ boys and ___ girls

★ 7. How long is the pencil? Each box is 1 centimeter long.

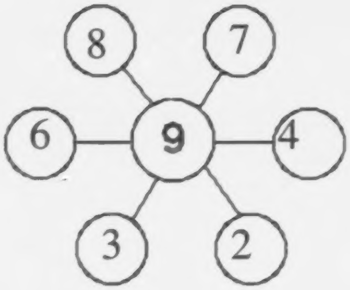


Answer: _______ centimeters

Commentary

Venus, XVI

1. **(One solution shown to the right.)** The numbers may appear on the array in a different position. Students will probably solve this simply by guess-check-revise. A few might notice that, since 9 already shows for each line, the other two entries on a line must total 10. So 8 can be matched with 2, 6 with 4, and 3 with 7.



2. **(Jan 10, 4, Jan 23)** Students should be familiar with a calendar by this point in the first grade. They may have played games similar to the questions asked, alternating roles with other students to ask the questions. In a previous *Superstars III* activity, students were asked to place the numbers on such a calendar.

3. **(157)** This problem is not new to students; however, in their books they may have seen the blocks already arranged for them from biggest to smallest, left-to-right. This problem requires that they understand that they must collect the tens together and the units together before proceeding. This problem is at a little higher level than typical ones found in textbooks.

4. **(Measure the student's drawing for 7 cm .)** In this problem, the student must use the 10 cm pencil from the drawing; therefore, his/her picture should be 7 centimeters in length. This problem is more activity-oriented than problem # 7 since students are asked to produce a figure in this problem.

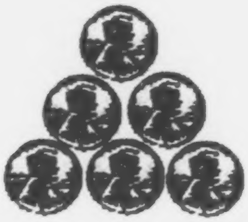
5. **(a. 10 b. 30)** This problem is an intuitive introduction to *rounding off to the nearest ten*. However, at this point students should find the answer by pointing out about where 13 and 28 are on the line, visually comparing their distances to the numbers asked. Placing the numbers 13 and 28 on the line involves *number sense*.

6. **(8, 2, 12 and 16)** This pictograph involves a key. Students previously considered such a pictograph, but there was only one symbol used in the chart. Here two symbols are used, introducing more complexity but also more opportunity for growth.

7. **(10)** The pencil has already been "lined up" for students so that all that is required is that they count the boxes to find the length.

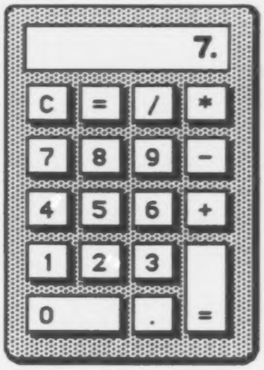
*Name:*__________________________
(This shows my own thinking.)

★★★ 1. Find a pattern. How many *more* pennies do you need in order to add three more rows?



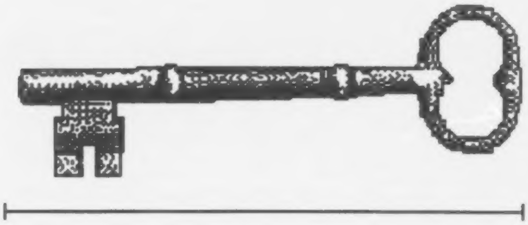
Answer: ________ pennies

★ 2. Tamika subtracted $5.00 from $12.00 on her calculator. She got the answer shown. Circle the sentence below that makes the best sense.



a. Her calculator may be broken.
b. Her calculator needs a battery.
c. Her calculator is working fine.

★★ 3. Measure the length of the key. Use an inch ruler.



Answer: _____ inches

★ 4. 10 - 9 + 8 - 7 + 6 - 5 + 4 - 3 + 2 - 1 + 0 =____

★★★ 5. Next year your older sister will be 12, your brother will be 14 and you will be 7 years old. You have a box of 35 birthday candles. Are there enough candles for the birthday cakes?

Answer: ________ (yes or no)

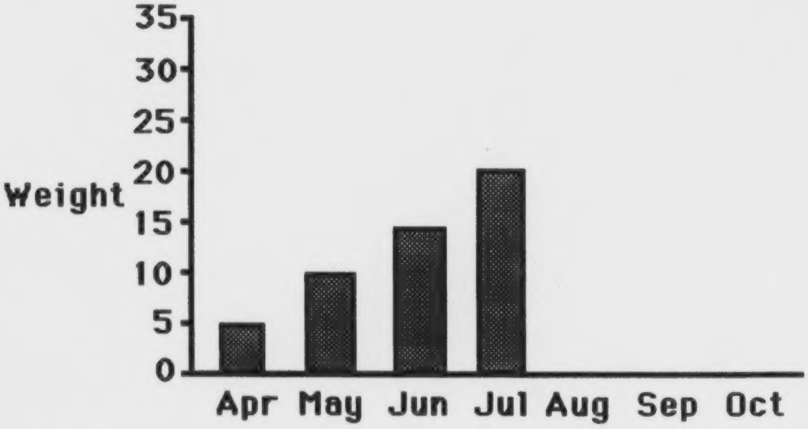
★ 6. Pretend that yesterday was May 5th. Then tomorrow would be May _____.

★★★ 7. Rachel got a baby chick for Easter. She made a graph of the chick's weight, in grams, each month.

a. How much did the chick gain from April to May? ____ grams

b. How much did the chick gain from May to June? ____ grams

c. Finish the graph. Show that the chick gained 5 grams each month through October.



Commentary

Venus, XVII

1. **(15 pennies)** Students can actually make the additional rows with pennies, or they might draw the pennies needed. Some will notice that each new row means the next consecutive number of pennies is added -- e.g, 4, then 5, then 6, then ....

2. **(The calculator is working fine.)** Although students this young haven't computed with decimals with paper and pencil, they can do this problem on a calculator and see what kind of answer they get. It makes intuitive sense to them, at least with money at this stage, that $7.00 means the same as $7.

3. **(3 inches)** The ruler must be placed so that the object being measured starts at zero, and then the other end of the object will be at the measurement. The student can read the inches directly. A few students might not align the object at zero and still get the right answer by counting the inches from where the object is aligned on the ruler.

4. **(5)** Students might do this problem on a calculator. Some who do it from left to right, one number at a time, will notice the pattern of the build-up for every two numbers considered. i.e., 10 - 9 gives **1**; then add 8 and subtract 7, and you have **2**; then add 6 and subtract 5, and you have **3**; and so on. Students will enjoy doing patterning problems such as this.

5. **(Yes)** The answer is yes because 12+14+7=33. Since you have 35 candles, there will be enough. Students may approach the problem by drawing a picture of the candles and counting, or perhaps they may use addition.

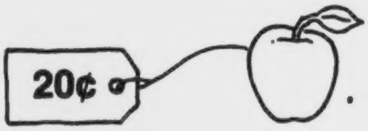
6. **(May 7th)** If yesterday was May 5th, today is May 6th, and tomorrow will be May 7th. Some students will forget to count "today" since it is not mentioned in the problem.

7. **(a. 5; b. 5; check the student's graph)** The bars on the graph should extend up in the same fashion as they do from April through July. Follow-up questions could involve the overall number of grams gained from April through October, or what would probably happen to the graph over time (the chick would not continue to grow at this rate).

SUNSHINE MATH
Venus, XVIII

*Name:*______________________________
(This shows my own thinking.)

★★ 1. You have a dime and four pennies. How much more do you need to buy the apple?



Answer: _____ ¢

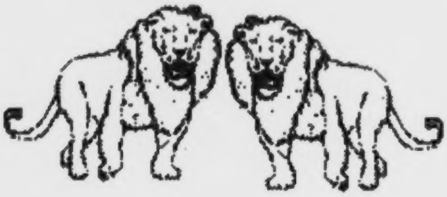
★★★ 2. Rachael goes to the zoo at 10:15. She stays until 1:00. Which animals can she see being fed?

Feeding Times

Animal	Time
monkeys	10:00 to 10:10
lions	10:30 to 10:45
elephants	11:00 to 11:30
bears	12:00 to 12:30
zebras	1:30 to 1:45
giraffes	2:30 to 2:45

Answer:______________________________________

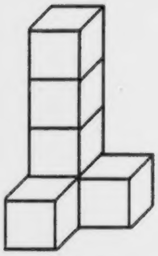
★★★★ 3. I saw some lions at the zoo. I counted 24 lion legs. How many lion tails did I see? How many lion eyes did I see?



Answer: ___ tails and

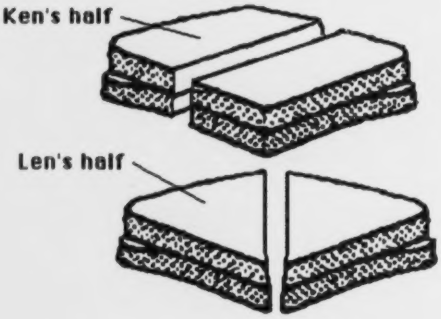
___ eyes

★★ 4. Paul made three figures like this from blocks. How many blocks did he use altogether?



Answer: ____ blocks

★★★ 5. Twins Ken and Len had the same size sandwich. Ken cut his sandwich in half and ate one part. Len cut his sandwich in half and ate one part. Who ate the biggest half?



Answer: _____

★★★ 6. In *arrow math* , follow the arrow. For example, 38→39 and 23↗14. Write the new number in each box.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

7 ↓ ☐ 4 ↓ ☐ 25 ↓ → ☐

★★ 7. Use *arrow math* to find this number:

24 ↗ →↗ ☐

Commentary

Venus, XVIII

1. **(6¢)** Students will need to know that a dime is 10 pennies and four more pennies is 14¢. Therefore, 6¢ more is needed to get to 20¢. Some will count up from 14 to 20, and some will subtract.

2. **(lions, elephants and bears)** Rachael arrives too late to see the monkeys being fed and leaves too early to see the zebras and giraffes being fed. This problem involves reading a chart and using knowledge of time.

3. **(6 tails and 12 eyes)** Students might draw the lions with stick figures, putting 4 legs on each until they have 24 legs. Then they can count the number of lions they drew, put a tail on each, and have the first answer. They might put two dots on each stick figure for the eyes and count to get the second answer.

4. **(18 blocks)** Each tower has 6 cubes, but one of them is hidden from view. If students actually make one of the figures, they will readily see this.

5. **(neither)** The twins ate the same size pieces. The best way to demonstrate something like this to students is to take 2 identical squares made of wood, cut them in the two ways shown, then weigh one piece from each cut. The two pieces should balance. If you try this with an actual sandwich, be sure that the bread is square or rectangular, without rounded corners, or the "halves" may be off somewhat.

6. **(17, 14, 36)** Many students will not realize what these symbols mean, and others will see it naturally. Those who have trouble probably don't realize that the first number shown is the beginning point, and the arrow shows movement from that spot on the chart to another number on the chart. The second number is the ending point on the chart. Students can practice this by placing a finger on the start number then moving with the arrow to the final number called for by the box.

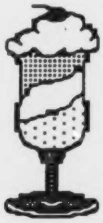
7. **(7)** This problem involves three of the arrow movements. These problems can be extended in the classroom by introducing the other arrow movements not shown, by stringing together more arrows, by using arrows which cancel each other's movement, and even by giving the arrows and the end number and asking where you started.

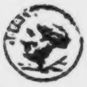
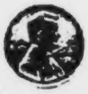
SUNSHINE MATH
Venus, XIX

*Name:*___________________________
(This shows my own thinking.)

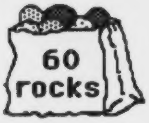
★ 1. How many dimes and how many pennies do you need to buy the ice cream sundae?

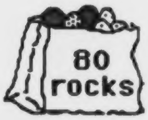
sundae	41¢
soda	36¢

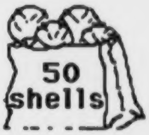


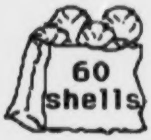
Answer: ____  's and _____  's

★★ 2. Amy bought 20 more rocks than shells. Which two bags did she buy? Circle the bags.





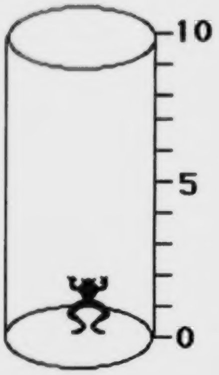




★★3. Jan tossed three beanbags.
Each beanbag landed on a different number.
Jan's score was 8.
What numbers did the beanbags land on?
Circle them.

1	3
2	4

★★★★4. A frog fell in a 10-foot deep hole. Starting at 5:00 o'clock, the frog jumped up 3 feet each minute. But he fell back 1 foot while resting for the next jump. What time did the frog get out of the hole? Draw a picture of the frog 's trip, to help you.



Answer: The frog got out at ______.

★★★ 5. Write the numbers and the number sentences. The first is done for you.

▲	▲	●
■	■	●
■	■	●

Shapes in All:	Remove:	Number Left:	Number Sentence:
9	all ▲'s	7	9 - 2 = 7
____	all ●'s	____	____________
____	all ■'s	____	____________
____	all ■'s and all ●'s	____	____________

★ 6. Draw 5 ✘'s in each box.

☐ ☐
☐ ☐

Draw 4 extra ✘'s.
How many ✘'s in all?

Answer: ________ ✘'s

Commentary

Venus, XIX

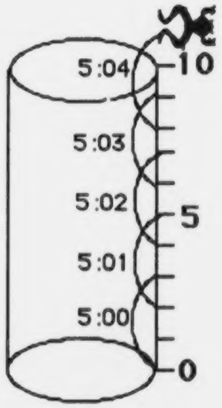
1. **(4, 1 or 3, 11, or 2, 21, or 1, 31, or 0, 41 are all acceptable.)** Most students will find this answer with no trouble. The most likely answer is to have the most dimes possible, but other combinations of dimes and pennies to make 41¢ are acceptable. Notice that there is extraneous information in the problem. This might bother some students if they have not met a problem of this nature previously.

2. **(The bags with 80 rocks and 60 shells should be circled.)** Students will need to compare the two bags of rocks and two bags of shells, looking for a difference of 20. By process of elimination (for example, 60 rocks and 50 shells won't work), they can find the answer.

3. **(1, 3, 4)** Students can find this answer by trial-and-error.

4. **(5:04)** The problem is an excellent one for which to draw a diagram. Such a diagram is shown to the right.

Some students might know how to get the frog out of the hole correctly but have trouble recording the minutes. Be somewhat lenient in interpreting their recordings of the time. What is more important is that they know that 5 jumps are required.



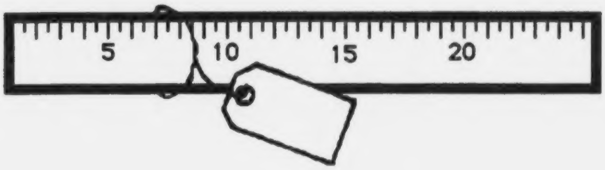
5. **(9, 6, 9 - 3 = 6; 9, 5, 9 - 4 = 5; 9, 2, 9 - 7 = 2)** The only difficult part of this problem is that the number to be removed is not recorded until it's written in the number sentence. Students who have difficulty with this problem might perform better if they have real objects (shaped as triangles, squares, and circles) and a 3-by-3 board. They can remove the objects as directed, recording as they do so.

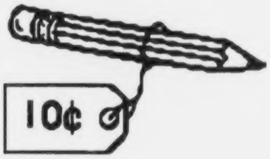
6. **(24)** Some students will make the marks in the boxes and simply count by ones to find the answer. Others, at a little higher level, will count by 5's and then by 1's. Others might add four 5's and then four 1's, and still others will put two groups of 5's together and count by tens.

SUNSHINE MATH
Venus, XX

*Name:*__________________________
(This shows my own thinking.)

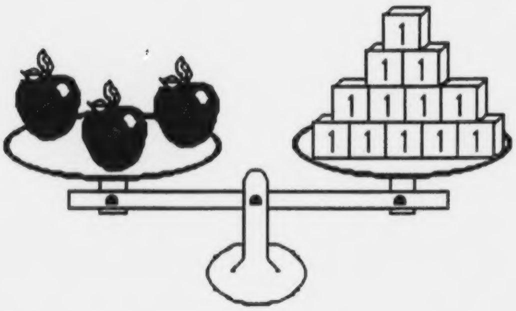
★★★ 1. Jake bought a pencil and a ruler. He spent a quarter and two pennies. How much did the ruler cost? Write the cost on the sales tag.



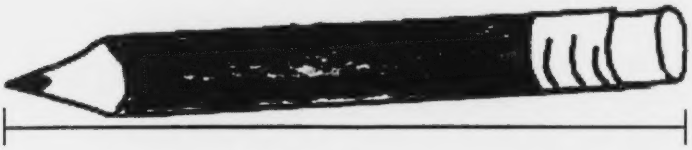


★★★ 2. Three apples were the same size. Jorge made the 3 apples balance with twelve 1-ounce weights. How much did each apple weigh?

Answer: ____ ounces



★ 3. Use an inch ruler to measure the pencil.

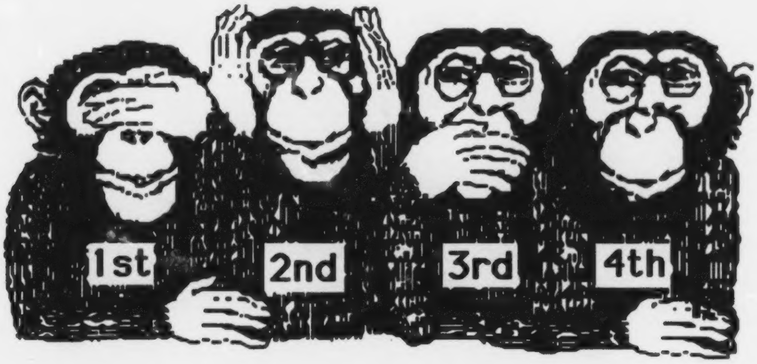


Answer: _____ inches

★★ 4. Pete and his 3 friends are lined up. Use these clues to find Pete's place in line.

- Pete is next to his friend that speaks no evil.
- Pete is not on the end.

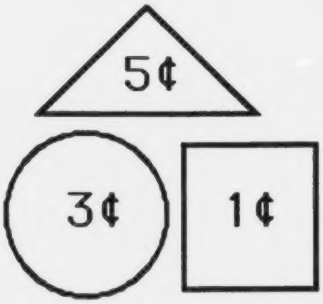
Write your answer here: Pete is ____ in line.



★ 5. If you write the numbers 1 through 30, how many times will you write a 3?

Answer: ______ times

★★ 6. Use these shapes. Create a picture worth 18¢. Your shapes can be larger or smaller than the ones shown. Draw your picture below:



Commentary

Venus, XX

1. **(17¢)** The problem is a two-step one for most students in that they must first determine that a quarter and 2 pennies are 27¢. Then they must find the difference between 27¢ and 10¢. Some students will think of it as a one-step problem, since putting a quarter and 2 pennies together to get 27¢ is something they will do subconsciously.

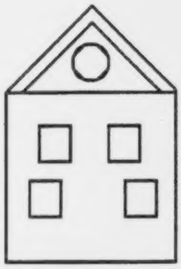
2. **(4)** Students might use 3 identical physical objects to represent the apples and 12 identical cubes or other objects to represent the weights. Their problem is then to divide the 12 cubes equally so that each apple has the same number of cubes.

3. **(4)** The student needs to align the "zero point" of an inch ruler with the end of the pencil in order to read the number of inches directly. Another might align the end of the pencil with any inch mark and count inches from there.

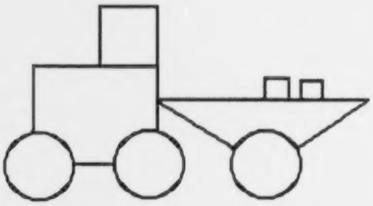
4. **(2nd)** The problem uses visual clues and the process of elimination to determine Pete's position in line. The problem also relies on students' familiarity with "See no evil, hear no evil, speak no evil." The first clue depends on a student's knowing that the "friend that speaks no evil" is the one with his mouth covered by his hand--the 3rd monkey. From this first clue we know that Pete is 2nd or 4th. The second clue eliminates Pete's being 4th.

5. **(4)** Some students might need to write the numbers from 1 to 30, but others can simply visualize them in their minds. The numbers which would have a "3" are: 3, 13, 23, and 30.

6. **(Answers will vary.)** Students should draw a picture made from circles, triangles, and squares, totalling 18¢. Two such pictures are shown below. The figures might overlap as the circles (wheels) do in the tractor below. Students might draw rectangles instead of squares, and that is acceptable.



House



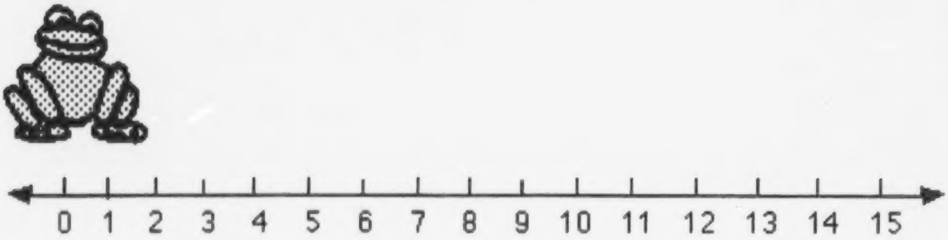
Tractor and wagon

SUNSHINE MATH
Venus, XXI

*Name:*________________________

(This shows my own thinking.)

★★ 1. A jump is three spaces. The frog starts at zero. He jumps forward 2 times, then jumps backwards 1 time. The frog jumps forward 2 more times. On what number does he end? Circle it on the number line.

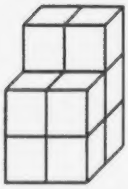


★ 2. If the frog above started at 1 instead of 0, and made the same jumps, where would he end?

Answer: ____

★★★ 3. How many blocks will you need to build this tower?

Answer: ____ blocks



★ 4. Use a calculator. Press: $\boxed{2}$ $\boxed{5}$ $\boxed{+}$ $\boxed{5}$ $\boxed{=}$ $\boxed{=}$ $\boxed{=}$ $\boxed{=}$ .....

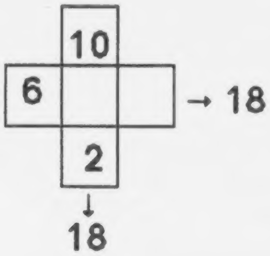
Stop when you reach 75.
How many times will you press $\boxed{=}$?

Answer: _______ times

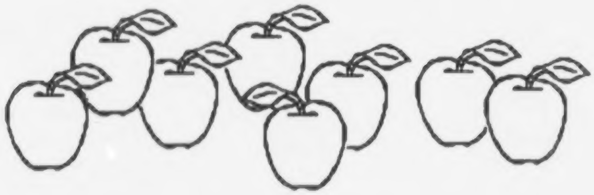
★★ 5. I have 4 coins. One is a quarter. I have 41¢ in all. What coins do I have? Draw your answer in the box.

Answer: ☐

★★ 6. The 3 boxes across have the same sum as the three boxes down. Write in the missing numbers.



★★★ 7. Linda had 8 apples. Half of them were green.



She ate one of the green apples. How many green apples did she have left?

Answer: _____ green apples

Commentary

Venus, XXI

1. **(9)** Students are likely to make their jumps on the number line itself using their pencils. It would help them to make single jumps of 3 units each time for each jump (rather than 3 small jumps of 1 unit each).

2. **(10)** Students will solve this in two ways. One is simply to go through all the jumps above, but starting at a different place on the line. The other way is to notice that starting at 1 will shift the whole action over 1 place. Thus, the frog will end on one more than the number for the problem above.

3. **(10)** Spatial visualization is needed on this problem unless real blocks are used to duplicate the figure. The blocks hidden from view must be accounted for. It's possible that more than 10 blocks can be used for this figure, with even more hidden from view than are necessary to build the figure as seen.

4. **(10)** The constant feature of a calculator is featured in this problem. Students may be curious about this feature and explore *counting by fives* or *counting by other numbers* using this feature.

5. **(1 quarter, 1 dime, 1 nickel, 1 penny)** The answer may be drawn or written. Students may start their approach by using the largest coin possible (a quarter), then moving to the next largest and so on.

6. **(6, 6)** The number in the middle box can be found first since the other two numbers that sum to 18 with it vertically, 10 and 2, are known. Therefore, the middle number must be 6. With similar reasoning this means the other box must have 6 in it also,. Some students will use logical reasoning such as this while others may simply *guess-check-revise*.

7. **(3)** Students will have intuitive knowledge of "half of a number" by this point in first grade. This problem is a two-step problem that first involves finding half of eight then removing one of those. In such problems, students should be encouraged to follow the steps with real objects rather than by using computation.

SUNSHINE MATH
Venus, XXII

*Name:*______________________
(This shows my own thinking.)

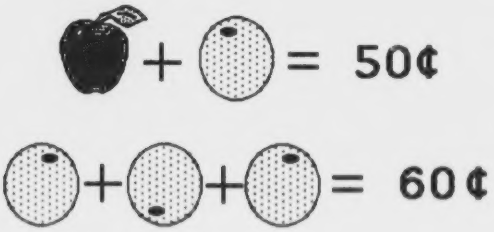
★★ 1. Karen, Joe and Keesha are playing a game.

Karen has 15 points. Keesha has 10 more points than Karen. Joe has 5 points less than Keesha.

How many points do Joe and Keesha have?

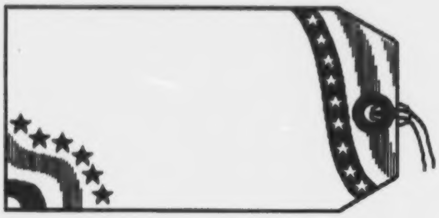
Answer: Joe has ______ points.
Keesha has ______ points.

★★★★ 2. How much does an apple cost?



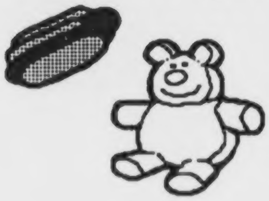
Answer: ______ ¢

★★★ 3. An angle is a corner where two straight lines meet. How many angles are there in the sale tag to the right?



Answer: ____ angles

★★★★ 4. Jane, Bill, Tom and Sue went to the school carnival. Jane won 4 prizes. Bill won 2 prizes. Tom did not win a prize. Sue won 6 prizes. Use the key to make the right number of happy faces for each child.



Jane	
Bill	
Tom	
Sue	

Key: 2 prizes = ☺

★★ 5. Roll a number cube 20 times.
Make a tally mark each time below the face that lands 'up'. Circle the face that comes up most often.

⚀	⚁	⚂	⚃	⚄	⚅

★★★ 6. Practice the problems below by adding in your head. Find numbers that add to ten. This will make your work easy.

6	7	9	2	5	8	1	3
2	1	8	5	6	9	3	4
8	3	1	5	1	2	7	6
4	9	5	2	4	1	6	8
+1	+2	+3	+3	+7	+4	+2	+7

When you turn in your paper, you will have a problem like this to do in your head. Put your answer here: ☐

Commentary

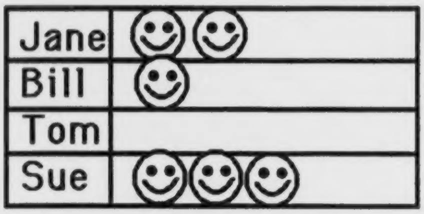
Venus, XXII

1. **(Joe -- 20; Keesha -- 25)** The problem has two steps. The first step is to add 10 to Karen's points to get Keesha's, and the second is to subtract 5 from Keesha's to get Joe's.

2. **(30¢)** Most students will first use the second clue to find the cost of an orange to be 20¢. This is done intuitively, rather than with the formal process of division, by asking themselves "what price, added 3 times, gives 60¢?" If students have trouble with this step, they might represent 60¢ with 6 dimes, and then divide the dimes into 3 equal piles. The first clue is then used. Knowing that an apple plus 20¢ is 50¢ gives the cost of an apple to be 30¢.

3. **(6)** Students might be encouraged to circle the angles. The two right angles will be easy for them. The other four will be less obvious, since they are closer together on the tag and are obtuse angles. Therefore, they don't appear as "sharp" to students. **Note**: Some students might give a very large number as an answer -- if they have tried to count the angles in the small stars; they should be given extra credit for noticing something that wasn't intended.

4. **(The pictograph is shown below.)** The main point of this problem is for students to use the key correctly.



5. **(Answers will vary.)** Check to see if there are 20 tally marks. Then check to be sure that the face with the most tally marks is circled. If two faces have the same number, then both should be circled.

6. **(23)** This problem encourages students to use *number sense* to look for easy ways to compute. In this problem, they look for numbers that sum to 10, put those together first, and then add on the remaining numbers as necessary. Some students will not do this, of course -- they will simply add the numbers in the order in which they appear. Such students should be given credit if they succeed with the problem below, but they should be encouraged to make their computation easy when possible.

Have this problem on several 3 x 5 cards for students to look at when they hand in their paper. The student is allowed to write only the answer, not any steps in getting the answer:

Add in your head:

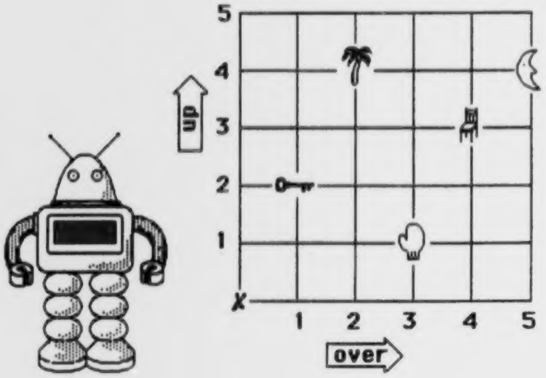
$$\begin{array}{r} 6 \\ 8 \\ 4 \\ 3 \\ \underline{+2} \end{array}$$

SUNSHINE MATH
Venus, XXIII

*Name:*__________________________
(This shows my own thinking.)

★★★★ 1. Help the robot. Tell him how many steps *over*, and how many steps *up*, to find an object. The robot always starts at ✗.

The first one is done for you in the chart.



To find the:	Go over:	Go up:
Tree	2	4.
mitten		
chair		
key		
moon		

★★ 2. Margo's cat had 4 kittens. Her hamster had 5 baby hamsters. She gave away 3 kittens and 2 hamsters. How many animals did she have left to play with?

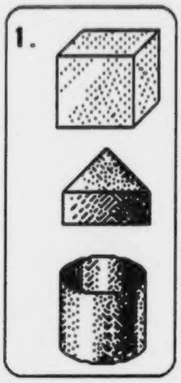
Answer: _____

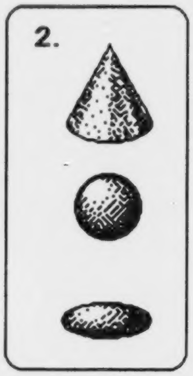
★★★ 3. Put either ¢ or $ beside each number below. The sentence should make sense after you are through.

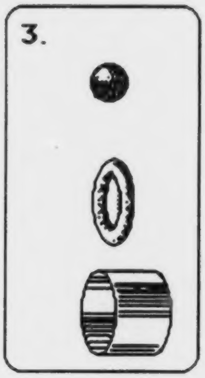
a. A new shirt might cost 10 .
b. A piece of bubble gum might cost 5 .
c. A new pencil might cost 25 .

★★★ 4. Match each picture with the best rule. Write the letter of the rule on the given line. Use each rule only once.

Rules A. They can all roll straight.
B. They can all be stacked on top of each other.
C. They all have a curved side.





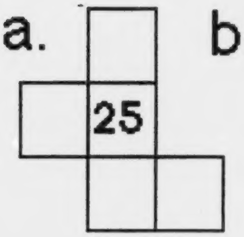


Rule: ____ Rule: ____ Rule: ____

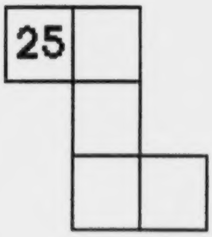
★★★★ 5. Use the number chart to fill in the missing numbers.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

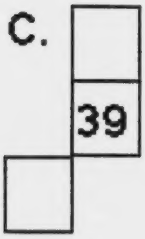
a.



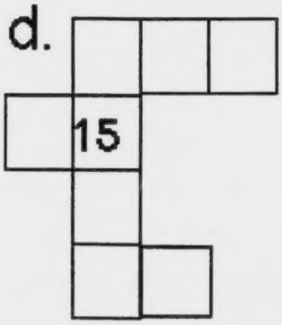
b.



c.



d.



Commentary

Venus, XXIII

1. **(mitten is 3, 1; chair is 4, 3; key is 1, 2; moon is 5, 4)** This problem is an intuitive introduction to the Cartesian Coordinate system. The horizontal distance is always given first, followed by the vertical distance. Even though this is merely a convention, it is a standard one, and students might profit from learning it at an early age.

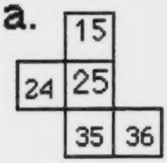
2. **(6)** This problem is multi-step, but students can act it out or draw a diagram to find the answer easily. Some students will forget to count the mother cat and the mother hamster along with the babies.

3. **($, ¢, ¢)** Students should use their common sense to judge which amount of money would be likely in each situation. A new shirt wouldn't cost 10¢, for example, but $10 is reasonable.

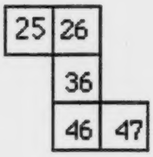
4. **(1 is Rule B; 2 is Rule C; 3 is Rule A)** Students should match the verbal clues with the three sets of geometric shapes. Some clues apply to individual objects in two sets but not to *all* of the objects in that set. The key for students is that the rule must apply to all objects in the set.

5. **(The answers are shown below.)** It is hoped that students will use this problem to begin looking for patterns in the typical charts they see in school. The hundreds chart is one example. For example, they might notice that the numbers directly above or below each other differ by 10; the numbers beside each other differ by 1; and the numbers diagonally connected differ by 11.

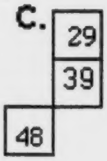
a.



b.



c.



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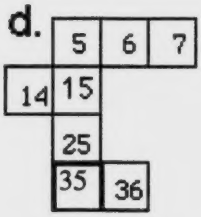


SUNSHINE MATH
Venus, XXIV

*Name:*____________________________

(This shows my own thinking.)

★★ 1. How old are you? ____
How old will you be in 10 years? ____

★★ 2. Circle the hidden facts.
Go across or down.
One is done for you.
Find at least 12 facts.

16	9	7	12	18	2	13
8	2	2	4	9	0	9
8	11	4	7	9	2	5
6	6	12	4	14	12	14
10	2	8	11	8	7	13
2	4	13	6	6	14	5
2	6	8	10	9	9	6
9	4	5	6	2	5	11

★★ 3. Find the pattern to fill in the missing numbers.

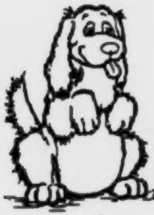
$$\boxed{3} \to \boxed{8} \to \boxed{} \to \boxed{18} \to \boxed{} \to \boxed{28} \to \boxed{33}$$

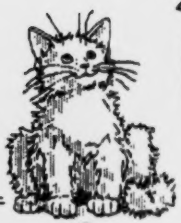
★ 4. You leave home at 4:15 PM. You must be home in an hour and a half. What time must you be home?

Answer: ______

★★ 5. Which animal won the pet contest? Circle the animal.

The winner's number is:
- less than the number of days in a week
- greater than 5 - 4
- is not the number of toes on one foot
- is not counted when you count by two's


1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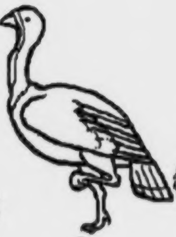
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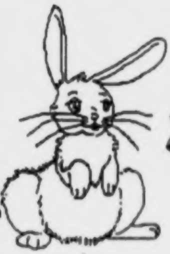
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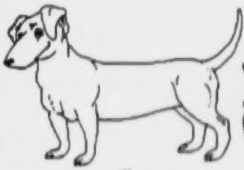
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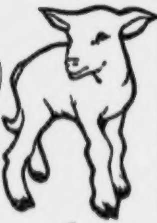
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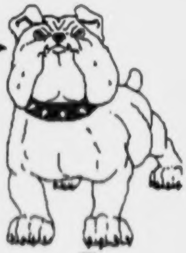
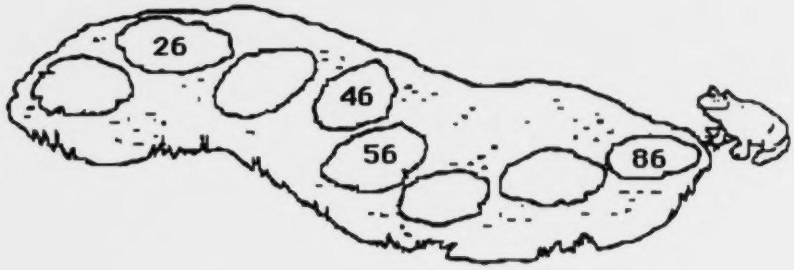

7

★★★★ 6. Help Fred the frog hop back across the pond. Fill in the missing numbers on the lily pads.



★★ 7. You and a friend share 5 pieces of gum equally. How much does each get? Circle the best answer.

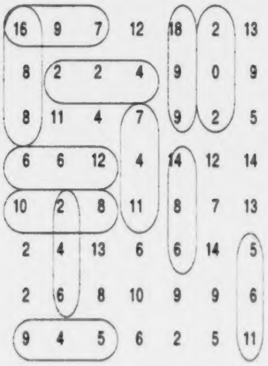
- One gets three pieces, the other gets two pieces.
- One gets four pieces, the other gets one piece.
- Both get two and a half pieces.

Commentary

Venus, XXIV

1. **(Answers will vary.)** The problem involves personal data, and the child is to add ten to his or her age.

2. **(At least 12 facts to earn 2 stars)** Others, besides the ones shown, are in the chart.



16	9	7	12	18	2	13
8	2	2	4	9	0	9
8	11	4	7	9	2	5
6	6	12	4	14	12	14
10	2	8	11	8	7	13
2	4	13	6	6	14	5
2	6	8	10	9	9	6
9	4	5	6	2	5	11

3. **(13, 23)** Students will probably notice that the numbers differ by five.

4. **(5:45)** Students might think of showing 4:15 on an analog (non-digital) clock, and then going around one full turn and another half turn, to increase the time by 1 1/2 hours. Or they might think of adding an hour first to the 4 in 4:15, making it 5:15. Then they might add 30 minutes to the 15 in 5:15, getting 5:45.

5. **(turkey)** The first clue eliminates 7, and the second clue eliminates 1. The third clue eliminates 5, and the last eliminates 2, 4, and 6. Therefore, by the process of elimination, the student should arrive at 3. It will help if students are taught to cross out things that they know can't be true.

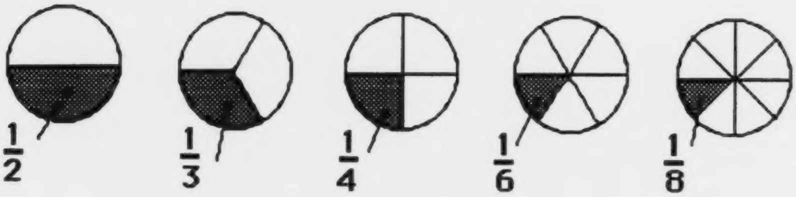
6. **(16, 36, 66, 76)** The pattern involves counting by tens, whereas problem 3 involves counting by fives. Students can work backwards until they find all of the numbers.

7. **(2 and-1/2)** The concept of sharing equally is an important one for work with fractions. In this problem, students have a chance to show that they understand intuitively both equal sharing and what one half means.

SUNSHINE MATH
Venus, XXV

*Name:*________________________
(This shows my own thinking.)

★ 1. Which piece of pie is the biggest? Write the fraction.

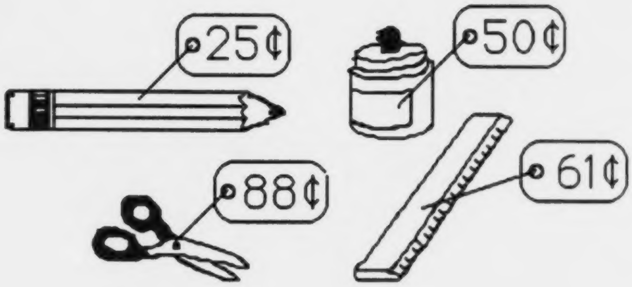


Answer: _____

★★★ 2. Use the tax chart to find the total cost for each item.

Tax Chart

Cost of an item	Tax
From 1¢ to 20¢	1¢
From 21¢ to 40¢	2¢
From 41¢ to 60¢	3¢
From 61¢ to 80¢	4¢
From 81¢ to $1	5¢



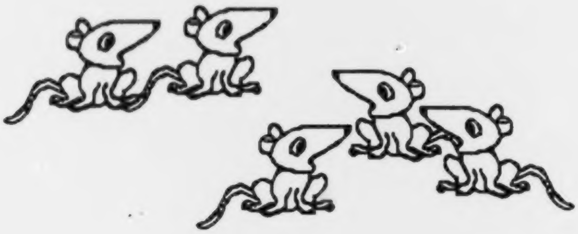
Answer: A pencil costs ____. Paste costs ____.

Scissors cost ____. A ruler costs ____.

★★ 3. Mary had $5.00. She bought bread for $1.00 and a candy bar for $1.00. How much change should she get from the store clerk?

Answer: ______

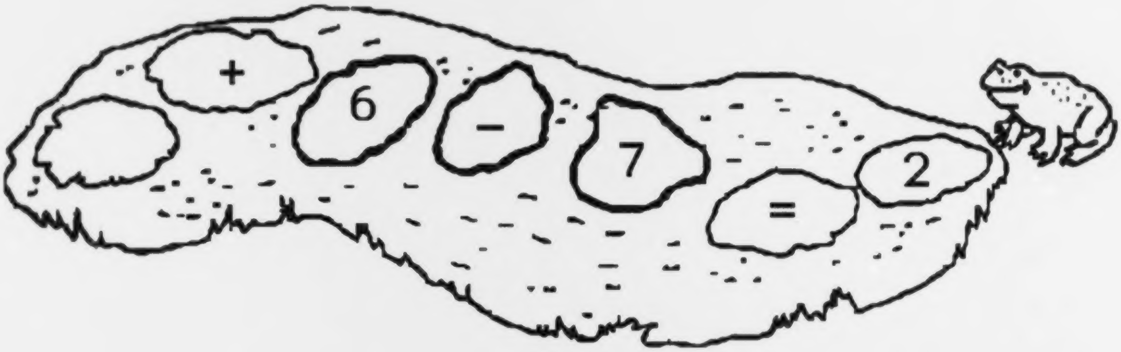
★★★★ 4. How many ways are there for 5 mice to live in two houses? Hint! Finish the chart.



🏠	🏠
0	5
1	4

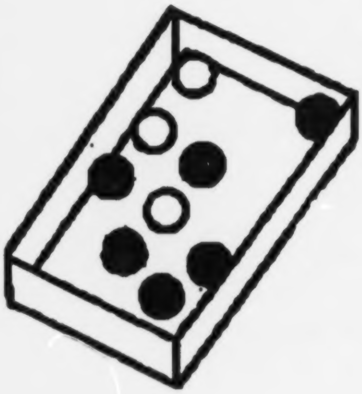
Answer: There are ____ ways.

★★ 5. Help Fred Frog hop back across the pond. Fill in the missing number on the lily pad.



★★ 6. Wayne had to pick up a marble without looking. Which one did he probably get, black or white?

Answer: He probably got
a _______ marble.



Commentary

Venus, XXV

1. **(1/2)** The problem is for students to pick the largest shaded area disregarding the size of the denominator of the fractions shown. This is an intuitive introduction to smaller denominators representing larger unit fractions.

2. **(Pencil: 27¢; Paste: 53¢; scissors: 93¢; ruler: 65¢)** Students have probably heard of adding tax to the cost of a purchase. If not, this would make an interesting introduction; including where some of the tax money goes could generate a nice discussion.

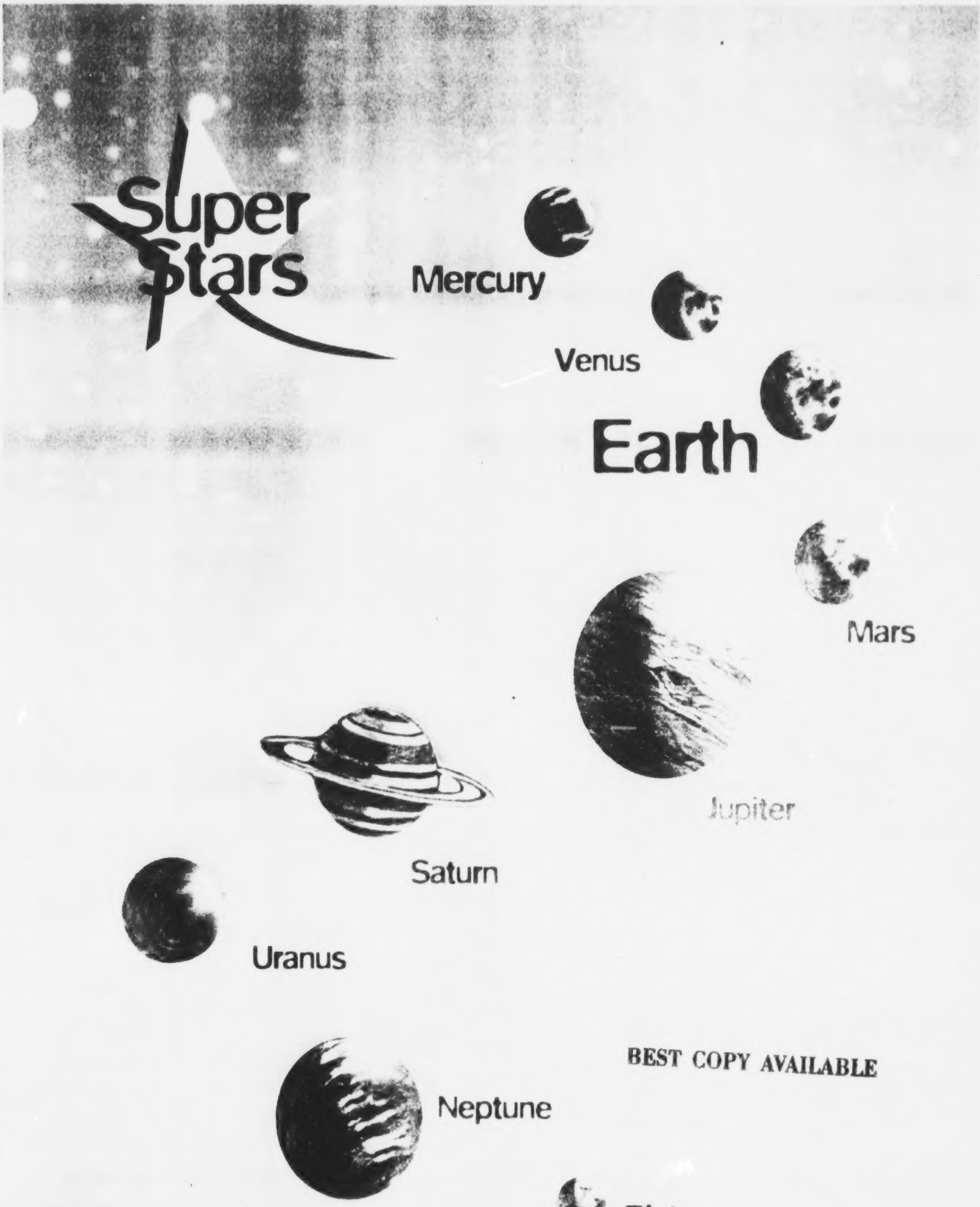
3. **($3)** The problem is not difficult if students know about dollars. In school, most of the concentration is on coins in the first grade, although there is no reason for students not to be introduced to dollars also. If so, the problem is essentially 5 – 2 = 3, ignoring the decimal points.

4. **(6)** This is an enjoyable problem for students. They might act it out and keep a record of all the ways they can find. Organizing their work (e.g., using the smaller numbers in order in the first house) will help them be successful.

5. **(3)** Students can solve this problem easily by *guess-check-revise*. If so, they'll simply guess the starting number and revise as appropriate. Another approach is to try to reason logically knowing that the number you're looking for when you subtract 7 leaves 2; that would have to be 9. Therefore, what must be added to 6 to produce that nine? This gives the result required.

6. **(black)** Students who do not have an intuitive sense of this probability problem would profit from an experiment with 6 objects that are identical to 3 other objects in all aspects except for color. They can be placed in a paper bag, out of sight, and the experiment tried 20 times. The students should be convinced by such an investigation that black will come up more often.

Super Stars


Mercury
Venus
Earth
Mars
Jupiter
Saturn
Uranus
Neptune
Pluto

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Public Schools of North Carolina
State Board of Education
Department of Public Instruction
Division of Instructional Services

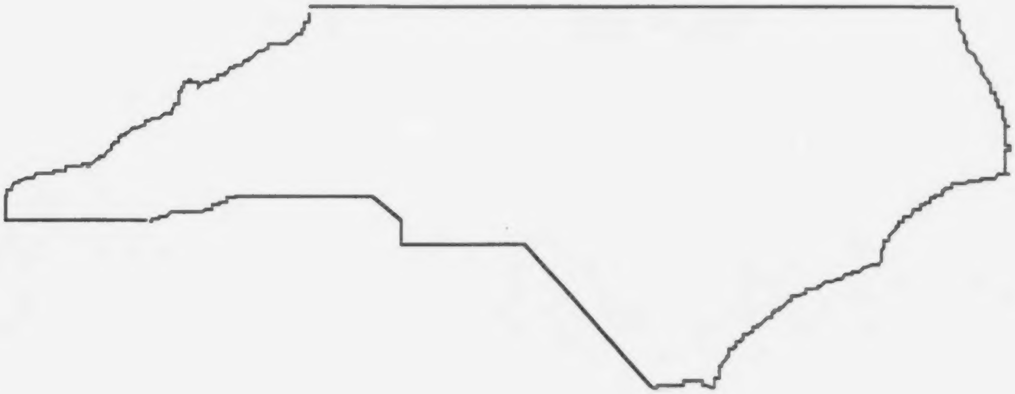
Published March 1998

☆ ACKNOWLEDGMENTS ☆

This project, originally designated ***Sunshine Math,*** is the third in a series of problem solving programs. It was conceived, coordinated and developed through the Florida Department of Education with input from the mathematics staff members of the North Carolina Department of Public Instruction and the South Carolina Department of Education. In addition, it was supported financially through a grant to the School Board of Polk County, Florida. The rich history of these materials and the predecessor programs, **SUPERSTARS** and **SUPERSTARS II** goes back to the early 1980's. Many Florida teachers have been involved in developing and using these materials over the years. The original **SUPERSTARS** programs were adopted and adapted by North Carolina and South Carolina with their teachers contributing to revisions and personalizations for use in their states. Florida educators were primarily responsible for developing, field testing, and publishing ***Sunshine Math.*** Educators from the Carolinas developed the **MathStars Newsletter** to accompany and enhance this program.

School districts in North Carolina have permission to reproduce this document for use in their schools for non-profit educational purposes. Copies of each grade level are available from the publications unit of the North Carolina Department of Public Instruction. The contact for **SUPERSTARS III** and the **MathStars Newsletter** is Linda Patch, 301 North Wilmington Street, Raleigh, NC 27601-2825 : (919-715-2225).

Michael E. Ward
State Superintendent
North Carolina Department of Public Instruction



☆ *Preface* ☆

SUPERSTARS III encourages and enhances the positive aspects of students, parents, teachers and administrators working together. This program assumes that students, even young children, are capable of and interested in learning; that teachers want to help them learn to think for themselves; that administrators see their jobs as clearing the path so that quality education is delivered effectively in their schools; and that parents care about their child's learning and are willing to work with the school system toward that goal. Each of these four groups has a vital role to play in implementing **SUPERSTARS III.**

The designer of this program has a long history of working with elementary children. He believes that they are capable of much more than we ask of them, and that many children are on the path to becoming independent learners. A number of children in any classroom are bright, energetic and willing to accept extra challenges.

The basic purpose of **SUPERSTARS III** is to provide the extra challenge that self-motivated students need in mathematics, and to do so in a structured, long-term program that does not impinge on the normal classroom routine or the time of the teacher. The system is not meant to replace any aspect of the school curriculum -- it is offered as a peripheral opportunity for students who identify with challenges and who want to be rewarded for their extra effort. Participation in the program is always optional -- only those students who voluntarily choose to participate will, in the long run, benefit from **SUPERSTARS III**. Any student, regardless of prior academic performance, should be encouraged to participate as long as interest is maintained.

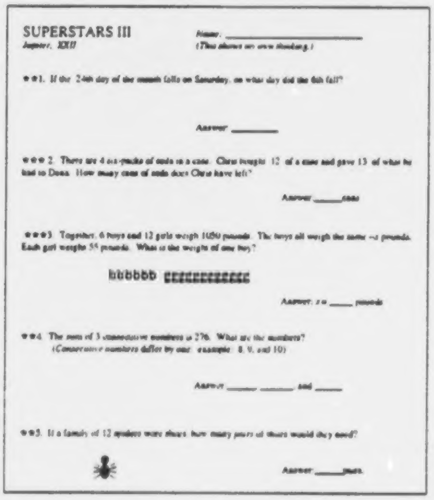
The predecessor program for **SUPERSTARS III** -- the **SUPERSTARS II** program -- has demonstrated that this concept can be extremely useful. What is required are several dedicated adults who devote a few hours each week to operate the system effectively in the school; an administrator who provides highly visible support; teachers who welcome a supplementary experience for their students to engage in higher-order thinking; and a typical classroom of students. If all of those ingredients are present **SUPERSTARS III** will become an integral part of the school fabric.

ORGANIZATION OF THESE MATERIALS

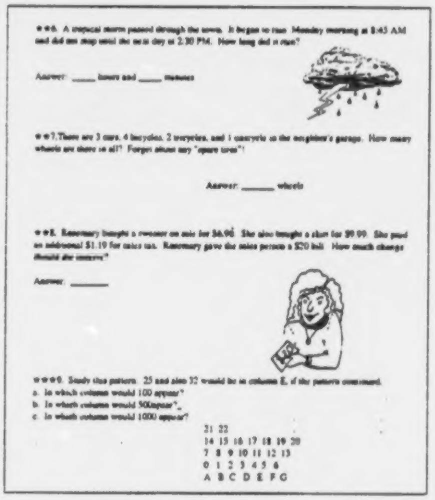
Section I Description of the **SUPERSTARS III** Program

1. General Information
2. Information/checklist for principals
3. Information/checklist for assisting adults
4. Information for teachers
5. Letter to participating students and their parents.

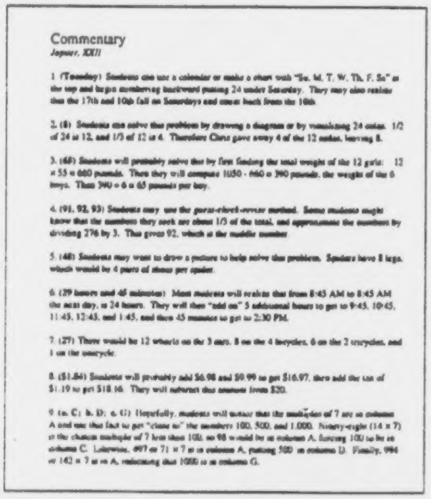
Section II Student worksheets for **SUPERSTARS III**



SUPERSTARS III



Section III Commentary for student worksheets for **SUPERSTARS III**



Commentary

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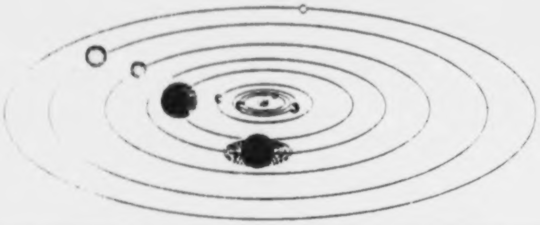
SUPERSTARS III: General Information

SUPERSTARS III is a K-8 program designed as an enrichment opportunity for self-directed learners in mathematics. The levels of the program are named for the planets in our solar system:



Kindergarten	Mercury	Fourth Grade	Jupiter
First Grade	Venus	Fifth Grade	Saturn
Second Grade	Earth	Sixth Grade	Uranus
Third Grade	Mars	Seventh Grade	Neptune
	Eighth Grade	Pluto	

Students of all ability levels choose on their own to participate in **SUPERSTARS III**. Seeing their names displayed in a prominent place in the school, with a string of stars indicating their success, is one reward students receive for their extra work. In some cases the school may decide to enhance this basic system by awarding certificates of achievement or some other form of recognition to highlight certain levels of success or participation in the **SUPERSTARS III** program.

SUPERSTARS III can function in a school in a number of different ways. A "tried and true" way is for assisting adults (volunteers, aides, etc.) to manage the program for the entire school, with support provided by school administrators and classroom teachers. This system has been adopted at the school level, with varying degrees of success, over the years. The basic model for conducting **SUPERSTARS III** is discussed below, with variations described on the next page.

The basic model

The basic model for **SUPERSTARS III** is for a school to establish a weekly cycle at the beginning of the academic year according to the following guidelines:

On Monday of each week student worksheets are distributed by the assisting adults to students in the program. Students have until Friday to complete the problems working entirely on their own. On Friday the classroom teacher holds a brief problem-solving session for the students in the program. The more difficult problems on the worksheet are discussed with students describing their thinking about strategies to solve the problems. They do not share solutions, only strategies.

Students receive double credit for those problems they have successfully completed prior to the problem-solving session, and regular credit for those they complete successfully over the week-end. On Monday all papers are handed in, checked by the assisting adult, and stars are posted for problems successfully completed. This completes one cycle of the **SUPERSTARS III** program.

SUPERSTARS III is not for every child -- it is only for those who are self-motivated and who are not easily frustrated by challenging situations. This does not diminish the value of the program, but rather makes us realize that there are children of all ability and socio-economic levels who are self-directed learners and who need challenges beyond those of the regular school day. These children will shine in **SUPERSTARS III.**

Variations of the basic model

The first variation that has been used successfully retains the weekly cycle and assisting adult role from the basic model. The teacher however, involves the entire class in the problem-solving discussions. For example, the teacher might select the four most difficult problems on the worksheet (indicated by three or four stars) and work a "parallel" problem with the entire class to open the mathematics lesson on Tuesday through Friday. Using this variation, all students are exposed to the problem-solving strategies, but only those who have chosen to participate in **SUPERSTARS III** will complete and turn in the worksheet on Monday.

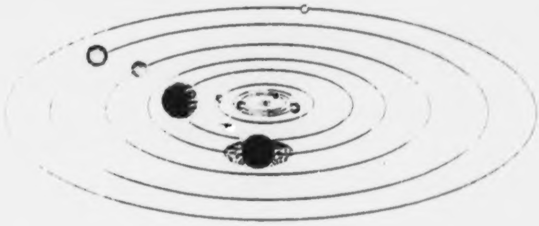
A second variation has the assisting adult manage the entire program, including the Friday problem-solving session . This method has been used in situations where teachers lacked commitment to the program and thus implemented it inconsistently. In such cases, the assisting adult must have a progressive view of what constitutes problem solving in elementary mathematics. They should also receive extra assistance from the administration to ensure that students are released from class and that the cycles proceed smoothly.

Yet another variation is for a parent to manage **SUPERSTARS III** at home for his or her own child. The basic rules are the same -- a child gets the worksheet once a week and time to work the problems alone. The parent sets a night to listen to the way the child thought about each problem, offering suggestions or strategies only when the child is unable to proceed. The reward system is basically the same, stars on a chart, but can be enhanced by doing something special with the child, such as a trip to the museum or to a sporting event when the child reaches certain levels of success. If this method is adopted, the parent must not try to teach the child, but rather to stimulate discussion of problem-solving strategies. **SUPERSTARS III** is not a program for adults to teach children how to think.

Other variations exist. The basic model as stated is the best, all other factors being equal, for reaching more children in a consistent fashion than any of the other methods. However, we encourage individual schools, teachers, or parents to get some version started; some starlight is better than none.

SUPERSTARS III: Information for Principals

SUPERSTARS III is a K-8 enrichment package for mathematics designed to be managed by volunteer assisting adults with coordinated support from the classroom teacher and school administrators. The purpose of the program is to give self-motivated students of all ability levels a chance to extend themselves beyond the standard mathematics curriculum. The complete set of materials comes in nine packages, one for each grade K-8. The grade levels are identified by the names of the nine planets in our solar system and their order from the sun:



Mercury - Kindergarten
Venus - First Grade
Earth - Second Grade
Mars - Third Grade
Jupiter - Fourth Grade
Saturn - Fifth Grade
Uranus - Sixth Grade
Neptune - Seventh Grade
Pluto - Eighth Grade.

Your support is vital if this program is to succeed. As the school administrator, you need to stay in close contact with the **SUPERSTARS III** program. A "checklist for success" follows:

☐ Become familiar with the philosophy and component parts of the program.

☐ Introduce **SUPERSTARS III** to the faculty early in the school year. Ensure that teachers understand the philosophy of the program and have copies of the student worksheets and commentaries appropriate for their grade levels.

☐ Speak to parents at your school's first open house of the year, explaining the purpose of **SUPERSTARS III** and the long term value of children working independently on challenging problems.

☐ Recruit several assisting adults (PTA members, aides, senior citizens, business partners, church members, etc.) who are enthusiastic, dependable people who are willing to manage the program. Early in the academic year, meet with these assisting adults to plan such details as:

✓ A prominent place and format for the STAR CHART.

✓ A designated time and place each Monday and Friday for the assisting adults to be in school to meet with students, distribute and collect worksheets, and post stars.

✓ A system for the activity sheets to be duplicated each week.

✓ A plan for extra incentives for accumulating stars. ("World records" to be kept from year-to-year, a celebration day planned for the end of school, prizes earned by students for attaining certain levels of success -- see the diagram below for examples.)

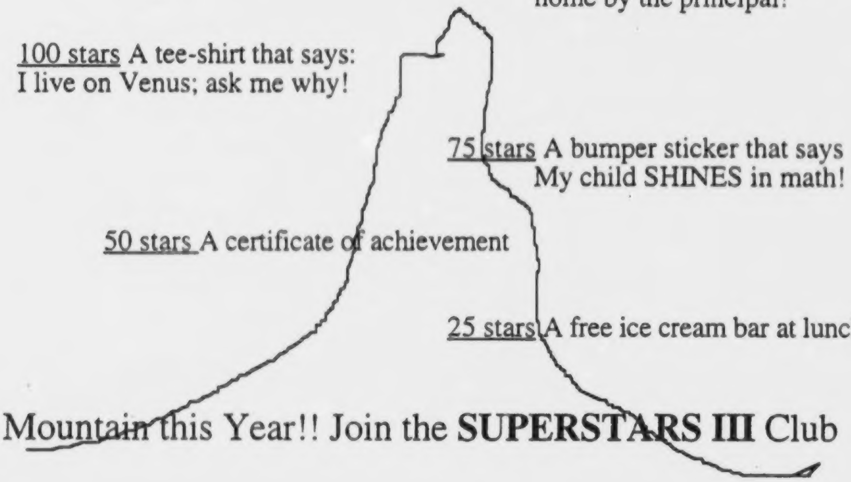
✓ A schedule for the initiation of the program and a decision as to a "start over" point later in the academic year. Review the school calendar and only use weeks that are at least four days long. If there is not enough time in the year to complete all the activity sheets, decide which to eliminate or on a plan to "double up."

✓ A **SUPERSTARS III** cap, name badge, tee-shirt, or other distinction for volunteers, if possible.

☐ Monitor the program every two weeks to get ahead of unforeseen difficulties. Administrators need to be highly visible and supportive for **SUPERSTARS** to succeed.

SUPERSTARS III is an optional program for students. It should be available to any student who wants to participate, regardless of prior success in mathematics. Typically, a large number of students will begin the program, but a majority will lose interest. A significant number however, will continue their efforts over the life of the program. This is normal and simply means that **SUPERSTARS III** is successfully addressing the needs of the self-directed learner.

Visual reminders help children see this mathematics program is challenging and rewarding. Some ideas are presented here:



150 stars A free pizza delivered to your home by the principal!

100 stars A tee-shirt that says: I live on Venus; ask me why!

75 stars A bumper sticker that says My child SHINES in math!

50 stars A certificate of achievement

25 stars A free ice cream bar at lunch

Climb the Mountain this Year!! Join the **SUPERSTARS III** Club

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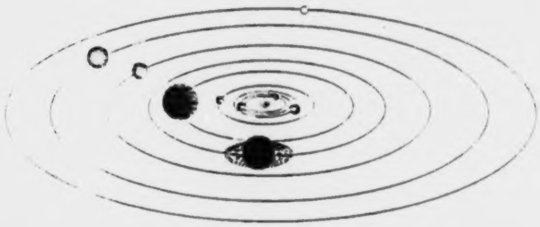
SUPERSTARS III: Information for Assisting Adults



SUPERSTARS III is designed to give assisting adults a well-defined role to play in the school's mathematics program. The success of **SUPERSTARS III** depends upon a team effort among teachers, administrators, parents and you. Reliability and punctuality are important - students will quickly come to depend upon you to be there as scheduled, to check their papers and post their stars, and to listen to alternate strategies and interpretations of problems to help them arrive at solutions. If possible, wear an outfit or badge that fits with the **SUPERSTARS III** theme or logo; students will soon identify you as an important person in their school.

* * *

SUPERSTARS III works on a weekly cycle. Each Monday you will collect the worksheets from the previous week and distribute new worksheets to the participating students, all from your **SUPERSTARS III** area of the school. Allow students to see the answers to the problems, discuss any for which their answers differ and allow them credit if their interpretation and reasoning are sound. After checking all the work, you will post the stars earned by students on the STAR CHART.

* * *

Participating students have from Monday until Friday to work the problems entirely on their own -- the only help they should receive during that time is for someone to read the problems to them. On Friday the teacher will host a problem-solving session in the classroom where students will describe the strategies they used to approach the more difficult problems. Students who have successfully completed problems before this session will receive double points for their efforts. The teacher's initials on the worksheet will help you identify those problems. The students then have the week-end to complete or correct their problems and turn them in on Monday. All the correct problems thus completed will receive the indicated number of stars.

* * *

Be creative when designing your STAR CHART. The basic method of posting stars individually is a good way to begin but eventually you will want a more efficient system. Color coding by grade level, or posting just one star each week with a number in its center are ideas to consider. You may wish to personalize the chart and the entire **SUPERSTARS III** center with student pictures, "smiling faces", a logo, seasonal theme or some other feature that has a mathematical flavor. Occasionally feature a reward for each child such as a cookie or a hand stamp in the shape of a star just for turning in the worksheet. You are helping enthusiastic students develop high-level thinking skills -- be creative and enjoy your role!

Checklist for assisting adults:

☐ Plan the following with the principal:

✓ A prominent place and format for the

☆**STAR CHART**☆

✓ The time and place for you to collect, check, and distribute worksheets.

✓ A system for duplicating worksheets each week which ensures legible copies. Also a secure storage area for masters and other materials.

✓ Any additional incentives ("world records," stickers, coupons, pencils, tee-shirts, etc.) that will be part of the system for rewarding levels of achievement in **SUPERSTARS III**.

☆

☐ Make the **SUPERSTARS III** center a happy place. Use bright colors, smiles, and cheerful expressions. Show confidence, friendliness, and encouragement to students.

☆ ☆ ☆

☐ Collect the letters that are sent home prior to the first worksheet. These need to be signed by each student and a parent. If, in the future, you have evidence that the work submitted does not represent the thinking of the student, discuss the situation with the classroom teacher. These situations are best handled individually, confidentially and in a firm, consistent manner.

☆ ☆

☐ Check the worksheets from the previous week uniformly. If you give partial credit for a problem with several parts do so in a fair way that can be understood by the students. Do not award partial credit for problems with only one answer.

☆ ☆ ☆ ☆

☐ Have answer sheets available and encourage students to look at the solutions when they submit their worksheets. Allow them to explain their strategy or interpretation if they have arrived at a different answer. Award full credit if they show a unique and plausible interpretation of a problem and follow sound logic in arriving at their response.

☆ ☆ ☆

☐ Leave extra worksheets with the classroom teacher for participating students who were absent on Monday. Accept a late-arriving worksheet only if the student was absent on Monday. If a student's name is missing or in the wrong place on the worksheet, check the paper but award stars to "No Name" on the STAR CHART. Adhering strictly to these rules will rapidly teach responsibility to the students and keep your work manageable.

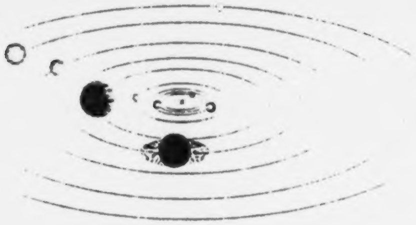
☆ ☆ ☆ ☆ ☆

☐ Keep all returned worksheets. As the same problems are used year after year, and many students have siblings who may later participate in **SUPERSTARS III**, it is important that worksheets do not circulate.

☆ ☆ ☆ ☆

☐ On weeks when **SUPERSTARS III** is not available post a notice such as "No star problems this week, but please come back after vacation for more!"

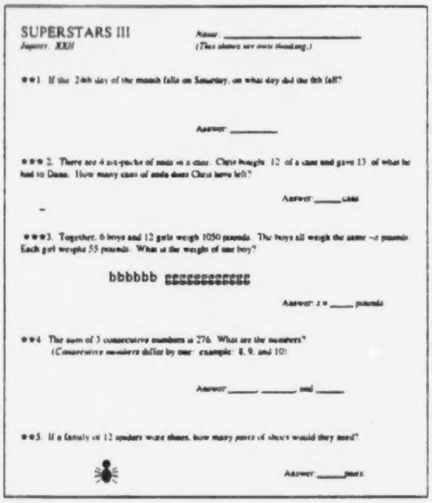
SUPERSTARS III: Information for Teachers



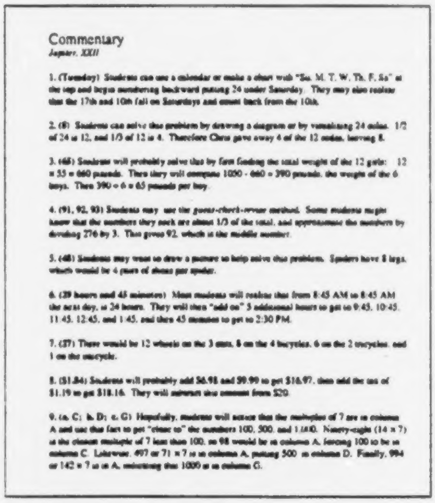
SUPERSTARS III is a program designed to complement your regular classroom mathematics curriculum. It offers a supplemental opportunity for students to practice mathematics skills appropriate for their grade level and at the same time to engage in challenging problem-solving activities. It is an additional challenge to those students who are self-directed learners providing them with an academic extracurricular activity.

* * *

Your involvement is essentially as a teacher. **SUPERSTARS III** will remain special to students if it is managed by someone outside of the classroom and if the teacher is viewed as a facilitator in the system, rather than as the authority figure. Your primary role is to monitor the system in your own classroom and to host a brief problem-solving session for **SUPERSTARS III** students on Friday of each week. You will also need to release the participating students from your class at a set time on Mondays to enable them to turn in completed work and receive new problem sets. You might make a special pin or banner for Mondays and Fridays to remind students that those days are special.



SUPERSTARS III



Commentary

Each student worksheet has an accompanying commentary page. This sheet provides hints on parallel problems which you might use in the Friday problem-solving session. It is important that students participate actively in this session, and that you

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solicit from them their unique and varied approaches to the problems discussed. Only after students have presented their ideas should you provide guidance on the problems and then only if they are having difficulty. Even though there is a commentary provided for each problem, you will have to decide which two to four problems you will cover during this brief session. Concentrate on those which provide a new or unfamiliar strategy. The problem-solving session should last no more than 15 minutes.

* *

Do not be disappointed if a large number of your students begin **SUPERSTARS III** and then significant numbers drop out after a few weeks. This is normal; problem solving requires a great deal of effort and not every student is ready for this challenge. On the other hand, you will notice that some students will choose to stay with **SUPERSTARS III** week after week even though they are not as successful as other students at earning stars. Their participation should be encouraged as they are certainly learning from the experience. Under no circumstances should **SUPERSTARS III** be reserved only for the advanced students in your class.

* * *

As a purely practical consideration, students are not to discuss the problems among themselves or with their families prior to the Friday cooperative group session. This allows the "think time" necessary for students to develop into independent thinkers; it also prevents students from earning stars for work that is basically someone else's -- the surest way to disrupt the entire **SUPERSTARS III** program. As the teacher you must monitor this in your classroom and ensure that students abide by the established rule.

*

It is important that you understand and support the overall philosophy of **SUPERSTARS III**. Do not worry if students encounter problems for which they have not been prepared in class -- such is the nature of true problem solving. Do not provide remedial instruction to ensure that students master certain types of problems. They will meet these same problem types repeatedly in the program. They will likely learn them on their own and from listening to other students at the problem-solving sessions. Enjoy what the students can do and don't worry about what they can't do. Read the general information and philosophy of the program to see how your role fits into the complete system.

Here are some thoughts you might find useful in your support for **SUPERSTARS III**:

☆ ☆ ☆

☐ Allow your students to leave the classroom at the designated time on Mondays to turn in their worksheets and pick up new ones.

☆ ☆

☐ Read each week's worksheet and feel free to structure classroom activities that parallel those in the **SUPERSTARS III** problems.

☆ ☆ ☆

☐ During the school week students may be allowed to work on their **SUPERSTARS III** problems during their free time, but the only help they may receive is for someone to read the problems to them. Give the students one warning if you find them discussing the worksheets, and take away their papers for the next violation. If it happens another time, suspend them from the program for a month.

☆

☐ At the Friday problem-solving sessions remember these points:

- Students come to this session with their worksheets, but without pencils.

- The session should be brief -- 15 minutes at most. Discuss only the two to four most difficult problems.

- Help students summarize their own approaches to the problems in a non-judgmental fashion. Offer your own approach last, and only if it is different from the students' strategies. Do not allow answers to be given to the problems.

- End the session by encouraging students to complete the problems over the weekend. Put your initials beside any problem discussed in class which a student has already successfully completed. The assisting adult will award double stars for these.

* *

☐ Remember that part of the **SUPERSTARS III** philosophy is that students learn responsibility by following the rules of the system. If participation is important to them they will adhere to the rules about where their names go on each paper, no credit awarded if they forget their paper on Monday, and no talking about problems prior to the problem-solving session.

* * *

☐ Enjoy **SUPERSTARS III**. Students will impress you with their ability to think and their creative ways to solve problems that appear to be above their level or beyond their experience.

* * *

Dear Student,

Welcome to **SUPERSTARS III**, a program designed to enhance your journey through mathematics. Be prepared to face challenging problems which require *thinking*! As you work through the system you will experience many types of problems, stretching and expanding your brainpower in many exciting ways!

Expect to receive one worksheet at the beginning of each week. You will have the rest of the week to think about the problems and come up with strategies for their solutions. The thinking and solutions must be YOUR VERY OWN!!! Once a week you will attend a help session to discuss the most challenging problems for the week.

Your journey will be recorded by charting the stars you earn. Each problem is ranked according to its level of difficulty. The more stars you see beside a problem, the higher its level of difficulty and, of course, the more stars you can earn for solving it. You can earn double stars for solving a problem before the weekly sessions.

Your signature is just the beginning.

Good luck as you embark upon this mathematical adventure! The rewards will last a lifetime!

* * *

I am ready to begin the **SUPERSTARS III** program. All of the answers I submit will represent my own thinking.

Name:____

* * *

* * *

Dear Parents,

Welcome to **SUPERSTARS III,** a program designed to enhance your child's journey through mathematics. By expressing an interest in challenging problem solving experiences, your student has taken the first step toward becoming an independent learner who is willing to address many types of problems.

On Mondays a **SUPERSTARS III** worksheet will be distributed to each child in the program. Each problem in the set is ranked according to its level of difficulty. As the number of stars increases, so does the level of difficulty and the earned stars to be awarded.

Each Friday a help session will be conducted to discuss the most challenging problems of the week. Any problem solved prior to the session will be given double stars. After the session, problems may be reworked before they are submitted the following Monday.

Your role in **SUPERSTARS III** is to encourage and facilitate problem solving. Feel free to offer guidance toward certain strategies, to read the problems to your child, but please, do not give them the answers. In order for this program to be effective, the students must work independently. The thinking must be their own!

It is normal for a student not to be able to complete every problem on every worksheet. The process of interpreting, understanding, and trying different strategies is valuable in the attainment of mathematical power. Remember, no student is expected to know the answer to every problem.

Thank you for allowing your child to embark upon this mathematical adventure; the rewards should last a lifetime!

____signature

Parent/Guardian of____

* * *

After you have had a chance to review and use these materials, please take a moment to let us know if the **SUPERSTARS III** material has been useful to you. Your evaluation and feedback is important to us as we continue to work on additional curriculum materials. Please respond to:

Linda Patch
Mathematics & Science Section
NC Department of Public Instruction
301 N. Wilmington Street
Raleigh, NC 27601-2825

Indicate the extent to which you agree with statements 1-4.

	Strongly Disagree		Neither Agree nor Disagree		Strongly Agree
1. The materials will be helpful in teaching the mathematics goals and objectives set forth in the NC Standard Course of Study.	1	2	3	4	5
2. The materials are appropriate for the grade level indicated.	1	2	3	4	5
3. The problems are interesting and engaging for the students I teach.	1	2	3	4	5
4. The commentaries will encourage use of this material.	1	2	3	4	5

5. I plan to use these materials with my students in grade______.

6. Have you ever used earlier versions of the SUPERSTARS material? YES NO

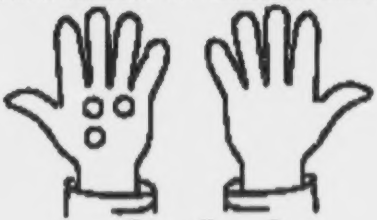
7. How was this program implemented with your students?

8. Additional comments:

SUNSHINE MATH
Earth, I

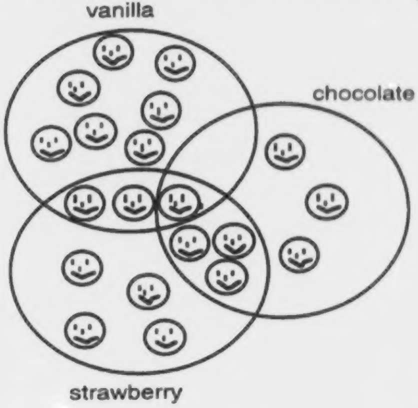
*Name:*________________________
(This shows my own thinking.)

★ 1. Andy found 3 red marbles and 5 green marbles. Draw circles on the other hand to make this number sentence true.



3 + 5 = 8

★★★ 2. Look at this drawing. How many children like *both* chocolate and strawberry ice cream?



Answer: ____ children

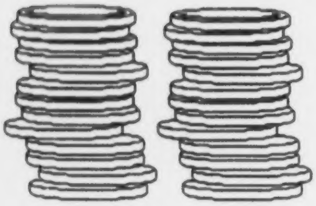
★★★ 3. Write the missing numbers.

a. 48, 49, ____, 51, 52, ____, ____, 55

b. 87, ____, 85, ____, ____, 82, 81

c. 15, 20, ____, 30, 35, ____, ____

★★★★ 4. When Pedro counts his pennies, he likes to make two piles that are the same height. He has an EVEN number if he can make the piles the same height. If he can't, he has an ODD number of pennies.



Even: Same height

Write "even" or "odd" beside each group of pennies using Pedro's method. Make piles of real pennies if it will help you decide.

Number of Pennies	Even or Odd
6	_____
9	_____
14	_____
16	_____
22	_____

★★ 5. Use a calculator. Push these buttons in order:

$\boxed{3}$ $\boxed{+}$ $\boxed{3}$ $\boxed{=}$ $\boxed{=}$ $\boxed{=}$

What number shows with the last $\boxed{=}$ sign?
Answer: ____

★ 6. Eight squirrels were in a tree. Half went to gather some nuts. How many squirrels were left in the tree?

Answer: ____ squirrels

Commentary

Earth, I

1. **(5 circles should be drawn in the right hand.)**

2. **(4 children)** There are 7 children who like chocolate and 10 who like strawberry. There are 4 children who like both chocolate and strawberry; they are in the overlapping part of the circles. Children might enjoy placing themselves in some loops like this, made from rope, for other types of food such as spinach, beans and peas.

3. **(a. 50, 53, 54 ; b. 86, 84, 83; c. 25, 40, 45)** Give a star to a, b, and c separately. Note that (a) is simply counting from 48; (b) involves counting down from 87; (c) is counting by 5's, starting at 15.

4. **(even; odd; even; even; even)** This problem is a concrete introduction to *odd* and *even* numbers. Students might enjoy practicing this process with other numbers of coins.

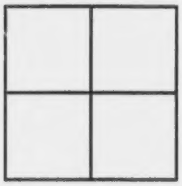
5. **(12)** The problem introduces students to the *repeating function* concept on a calculator. Most hand-held calculators will repeatedly add, subtract, multiply and divide in this manner. It is interesting for students to experiment to discover which number entered is the one that their calculator repeatedly uses. For the problem $\boxed{5}\ \boxed{+}\ \boxed{3}\ \boxed{=}\ \boxed{=}\ \boxed{=}\ \boxed{=}$, for example, do they get 17 or 23?

6. **(4)** Many students will intuitively know that half of 8 is 4, so 4 squirrels went to get nuts. Thus, 4 squirrels are left behind in the tree. If students have been taught a rule such as "how many are left means to subtract," they might not know how to solve this problem because there is no obvious number to subtract.

SUNSHINE MATH
Earth, II

*Name:*________________________
(This shows my own thinking.)

★★ 1. How many squares are in this picture?



Answer: _____ squares

★★ 2. How many different ways can you add two numbers from 1 through 9 to make 10? (1 + 9 and 9 + 1 count as two ways to make 10.)

Hint: Make a list

My List:

____________ ____________
____________ ____________
____________ ____________
____________ ____________
____________ ____________

Answer: _____ ways

★★★ 3. You have 2 nickels and 3 pennies. You want to trade them for a quarter. How much more money do you need before you can trade fairly?

Answer: _____ ¢

★ 4. On the line below, draw the shape that comes next in the pattern.

■◆◆♥♥♥■◆◆♥♥♥■◆◆♥♥♥■◆____

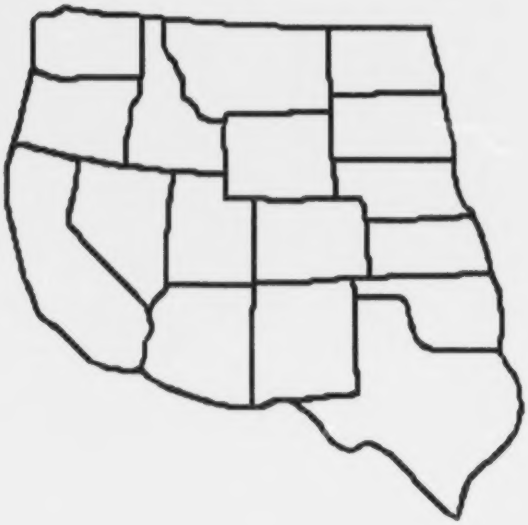
★★★ 5. Do these problems on your calculator. Write your answer in the box:

a. 27 + 54 + 75 + 403 = ☐

b. 385 - 76 + 541 = ☐

c. 372
54
+ 846
☐

★★★★ 6. Color this map using only 4 colors. No state can be the same color as one that touches it.

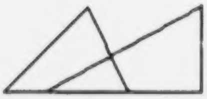


Hint: You can use this code instead of real colors, if you want to:
R=red G=green
B=blue Y=yellow

Commentary

Earth, II

1. **(5)** There are four small squares and one large square. Students may enjoy doing other problems of this nature in which they find figures within other figures. For example, how many triangles are in this figure? (3)



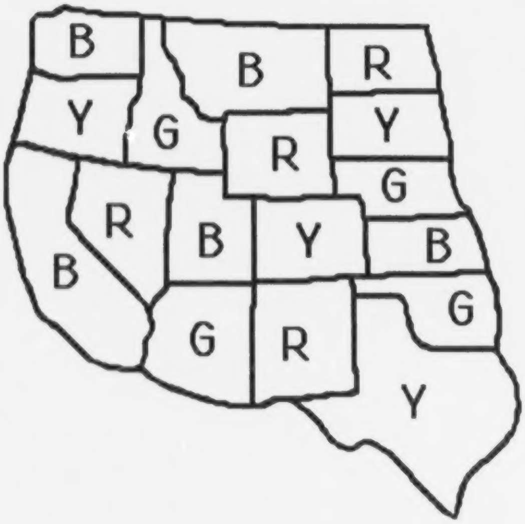
2. **(9)** 9 + 1; 8 + 2; 7 + 3; 6 + 4; 5 + 5; 4 + 6; 3 + 7; 2 + 8; 1 + 9.

3. **(12¢)** Two nickels and 3 pennies is 13¢, and the difference between 13¢ and a quarter is 12¢. Some students may have trouble with this problem if they don't know the value of the coins.

4. **(◆)** The pattern which repeats is ■ ◆ ◆ ♥ ♥ ♥. The fourth repetition of this pattern has started, and the first two figures are shown, leading to the third in the sequence as the one to follow.

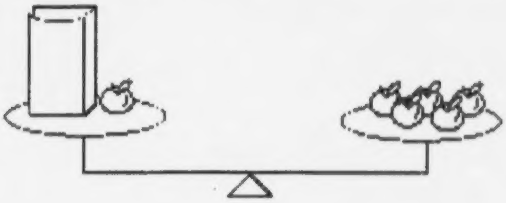
5. **(a. 559; b. 850; c. 1,272)** Give a star for a, b, and c separately.

6. **(One possible answer is shown; there are other possible answers.)** Students may enjoy knowing that this is related to one of the "50 famous unsolved problems in mathematics" of the 80's. The problem was that everyone thought that such a map could be colored in four colors or less, so that no two boundaries the same color touched except at a point, but no one could prove it. Eventually the problem was solved, but for years and years, mathematicians enjoyed coloring maps like this, looking for an exception to the conjecture.



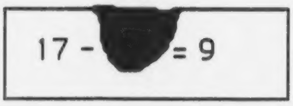
*Name:*________________________
(This shows my own thinking.)

★★★ 1. How many apples are in the paper bag? You may use counters to help. (The bag itself does not weigh anything.)



Answer: _____ apples

★ 2. What number goes in the missing place?



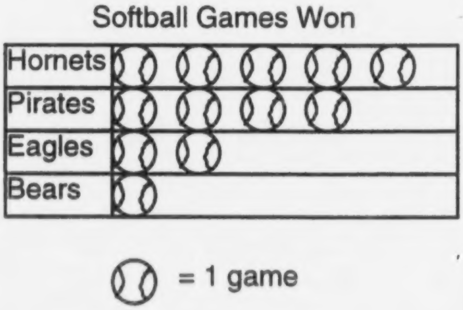
Answer: _____

★★★ 3. a. How many more games did the Hornets win than the Eagles?

_____

b. Which team won exactly 2 games more than another team?

_____

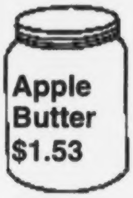


c. Even out the 12 wins so that each team has the same number of wins as the other teams. How many wins would each team have? _____

★★★ 4. Put the right number in each box to make true statements. Use a calculator if you need to.

a. 67 - ☐ = 23   b. 28 + ☐ = 60   c. ☐ -16 = 36

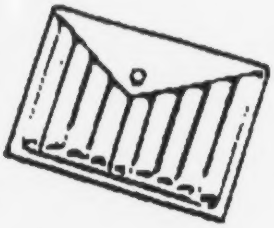
★★ 5. You want to buy a jar of Apple Butter. How much will the Apple Butter cost if you use this coupon?



-COUPON-
Save 25¢ OFF
Apple Butter

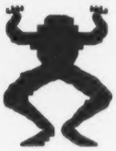
Answer: _____

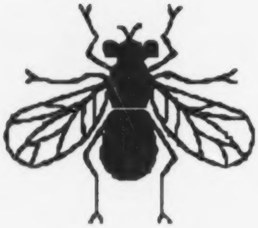
★★★ 6. There are nine markers in one box. If you had to give one marker to each of the 29 students in your class, how many boxes would you have to buy?



Answer: ____ boxes

★★★★ 7. All insects have 6 legs, and all frogs have 4 legs. If Joey caught 2 insects and 3 baby frogs, how many legs would there be on all those creatures?





Answer: _____ legs

Commentary

Earth, III

1. **(4)** The bag needs to have four apples in it so that the scales will have the same weight on both sides. This assumes that all apples weigh the same. This problem is an important one to lay a concrete foundation for algebraic thinking.

2. **(8)** The student may think: *what number, plus 9, equals 17?* Eight + 9 = 17 is part of a family of facts which also includes: 9 + 8 = 17, 17 - 9 = 8, and 17 - 8 = 9.

3. **(a. 3 ; b. Pirates; c. 3)** The Hornets won 5 games; the Pirates won 4 games; the Eagles won 2 games; and the Bears won 1 game. For part a, the Hornets won 5 games and the Eagles 2 games. Therefore, the Hornets won 3 games more than the Eagles. For part b, the Pirates won two more games than the Eagles. For part c, the student might want to get 12 pennies and move them around until he/she gets the same number in 4 different piles. If the student "even outs" 12 into 4 piles, he/she will get 3 wins; or 12 ÷ 4 = 3. This is a concrete introduction to the concept of getting an *average*.

4. **(a. 44; b. 32; c. 52)** The student may use "guess-check-revise" to find the answer by repeatedly trying different numbers for each box until he/she gets one which works. Some students might realize that they can solve a different problem than the one given. For (a), they might solve by adding: $23 + \square = 67$; or they might solve by subtracting: $67 - 23 = \square$. Problems (b) and (c) can also be worked by solving a different problem.

5. **($1.28)** The student subtracts the value of the coupon, 25¢, from the cost of the apple butter, $1.53, giving $1.28.

6. **(4)** Purchasing 3 boxes of markers would provide 27 markers since 9 + 9 + 9 = 27. One more box is needed to give one marker per student, but 7 markers would be left over.

7. **(24)** The two insects would have 6 + 6 or 12 legs to offer to the collection. The three frogs would have 4 + 4 + 4 or 12 legs to add also. Therefore, there is a total of 24 legs. This is a multistep problem which students can solve by drawing a picture of the frogs and insects and counting legs. Or they might use the picture given in the problem and count the legs that way.

SUNSHINE MATH
Earth, IV

*Name:*__________________________
(This shows my own thinking.)

★★ 1. I am thinking of two numbers.

- Their sum is 17.
- One number is 5 more than the other.

What are the two numbers?

Answer: ____ and ____

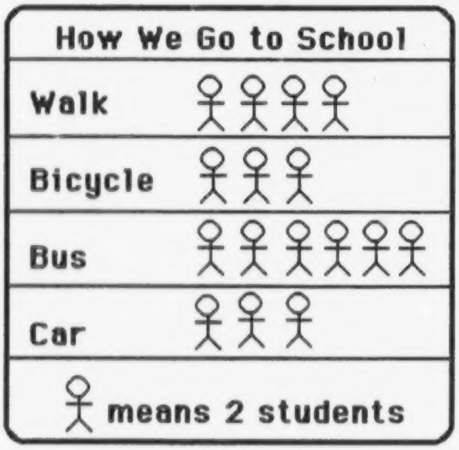
★★★ 2. Look at this graph. Then answer each question.

a. How many students ride the bus? _____

b. How many more students walk than ride in a car? ___

c. Which two ways are used by the same number of students?

______ and ______



★★★ 3. The letters A,B,C and D each stand for a different single digit. Use the clues to find the digits.

Clues:

- C is greater than 1.
- C is an *odd* number.
- B and D are *even* numbers.

$$\begin{array}{r} C\,A \\ +C\,B \\ \hline D\,C \end{array}$$

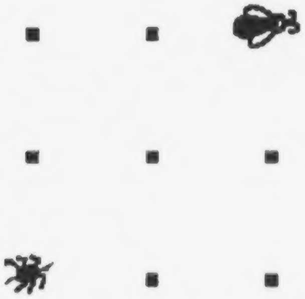
What number does D stand for?

Answer: D = ____

★★ 4. Kambro had 20 rabbits in one pen and 12 hamsters in another. He sold 4 rabbits and 7 hamsters. How many pets does he have left?

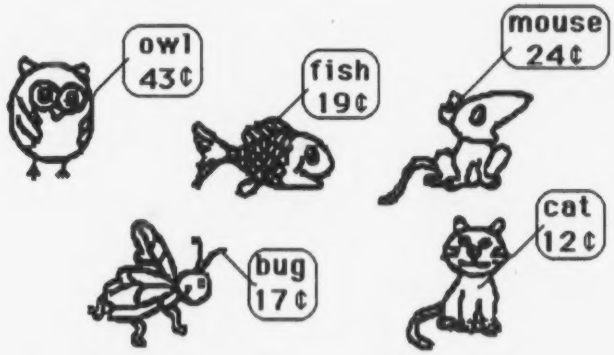
Answer: ____ pets

★★★★ 5. Charley the spider can move only up ↑ or across → to get to the fly. How many paths altogether are there for Charley to get his meal?



Answer: There are ____ paths.

★★★★ 6. Nedra lost a tooth and got 25¢ from the tooth fairy that night. The next day she bought one of these animals and got 2 coins back as change.



a. Which animal did she buy? ______

b. What coins did she get back?

_________ and _________

Commentary

Earth, IV

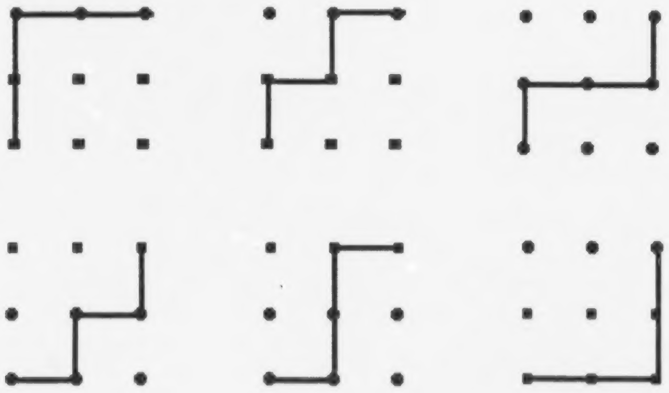
1. **(11 and 6)** Students might think of all the number pairs which sum to 17 and, from that, select the one in which one of the numbers is 5 more than the other.

2. **(a. 12; b. 2 ; c. bicycle and car)** The key to success for students is to notice the key to the graph, that each figure stands for two students. They can find most answers by counting by twos for each category then comparing categories.

3. **(D = 6)** Students may use "guess-check-revise" to help solve the problem. There are some additional clues also -- for example, C can't be 5 or greater since that would produce an extra digit in the answer to the left of D. So C must be 3. Some students might not understand the hints because they don't yet know the difference between *odd* and *even* numbers although this was covered in Worksheet I for this grade level. A=1, B=2, and C=3; therefore, D=6.

4. **(21)** There are several approaches to the problem. Some students will add all of the animals together to get 32, then subtract 11 and get 21. Other students might keep the animals separated in their minds, subtracting 4 rabbits from 20 rabbits and 7 hamsters from 12 hamsters, getting 16 rabbits and 5 hamsters left. Adding those together gives 21 animals. Some might just make marks on a paper and count what's left after marking out the right number.

5. **(6)** The possible paths are shown below:



6. **(a. fish; b. nickel and penny)** Nedra could not have bought the owl as it costs more than 25¢. If she bought the mouse, her change would only be 1¢ (only one coin). If she bought the bug, her change would be 8¢ which would be at least 4 coins (a nickel and 3 pennies). If she bought the cat, her change would be 13¢ or at least 4 coins (a dime and 3 pennies). If she bought the fish for 19¢, her change would be 6¢ or possibly 2 coins (a nickel and a penny). The fish is the only correct answer.

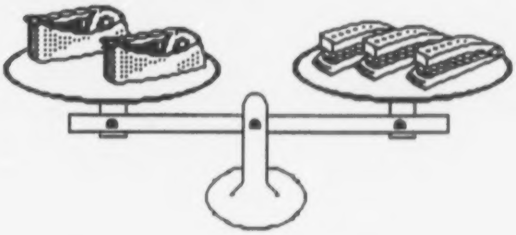
SUNSHINE MATH
Earth, V

*Name:*________________________
(This shows my own thinking.)

★1. If November 8th is Wednesday, what day of the week is November 16th?

Answer: ____________

★★★ 2. Which weighs the most, the tape holder or the stapler?



Answer:
_____________ is heavier.

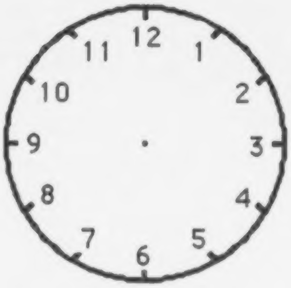
★★★ 3. Nancy saw a car, a van, and a truck cross a bridge. The truck crossed the bridge after the van. The car crossed the bridge before the van. In what order did the car, the van, and the truck cross the bridge?

Answer: First ___________,
Second ___________,
Third ___________

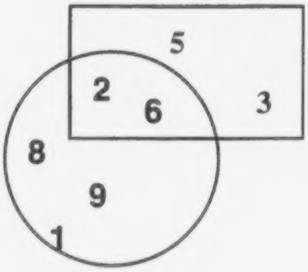
★★★ 4. Write the numbers in the boxes to make true statements. Use a calculator if it helps.

a. 46 - ☐ = 23 b. 18 + ☐ = 30 c. ☐ - 14 = 24

★ 5. Tamika gets home at 3:00. A half hour later she can go play outside. Draw the hands on the clock to show when she can go play.



★★★ 6. a. What is the sum of the numbers *not* in the rectangle? _____



b. What is the sum of the numbers in *both* the rectangle and the circle?

_____

c. What is the sum of the numbers *in* the rectangle *but not in* the circle?

_____

★★★ 7. Sally has 79¢. She bought an apple for 20¢ and a balloon for 19¢. How much did she have left?

Answer:_____¢

★★ 8. A lunch at Sunshine Elementary school costs 95¢. About how much would it cost to eat there for a whole school week? Circle the best answer below.

About \$2 About \$3 About \$4 About \$5

Commentary

Earth, V

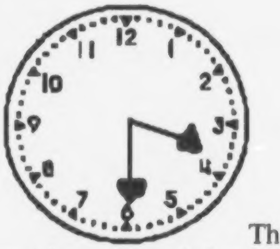
1. **(Thursday)** The students may make a calendar, starting with Wednesday the 8th, and put the numbers in from 7 down to 1 and then from 9 up to 16.

2. **(tape holder)** This problem will be difficult for many students who do not have an intuitive understanding of balance situations. It will be difficult for them to see that if 3 of object A weigh the same as 2 of object B, then B must be heavier. Actual balance scales in the classroom would help students see this inverse relationship between the number of objects that total a certain weight and the weight of an individual object.

3. **(First: car; Second: van; Third: truck)** Students might act it out or find it helpful to write each word on an index card and move the cards around until each vehicle is in the correct order.

4. **(a. 23; b. 12; c. 38)** The student may use "guess-check-revise" to find the answers: 46 - 23 = 23; 30 - 18 = 12; and 24 + 14 = 38. They also might do different problems from the ones given, by solving a related problem such as $46 - 23 = \boxed{}$ or $23 + \boxed{} = 46$ for (a) and so on for (b) and (c).

5.



The student should understand the hour and minute hands on a clock. The hour (shorter) hand should be between 3 and 4; the minute (longer) hand should be on the 6.

6. **(a. 18; b. 8; c. 8)** This problem is related to Venn diagrams which students have likely met in first grade. They may need to be reminded that numbers can be in more than one figure. For part a, the numbers *not* in the rectangle are 8, 9, and 1; 8 + 9 + 1 = 18. For part b, the numbers in both the rectangle and circle are 2 and 6; 2 + 6 = 8. For part c, the numbers in the rectangle and *not* in the circle are 5 and 3; 5 + 3 = 8.

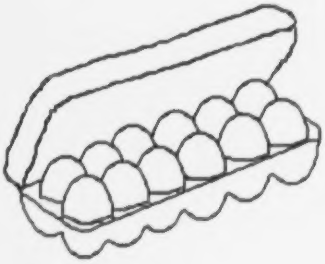
7. **(40¢)** This problem can be solved in 2 steps by adding the two numbers and subtracting their sum from 79¢, or by subtracting one number from 79¢ and then the next number from what is left. In either case, the answer is 40¢.

8. **(about $5)** Students should realize that 95¢ is close to $1 and that there are 5 school days in a week. Therefore, it will cost about $1 a day for five days or about $5 for lunch at the school for a week.

SUNSHINE MATH
Earth, VI

Name: ______________________________
(This shows my own thinking.)

★★ 1. Margo has nine eggs. She bought a dozen more and used a half-dozen of them. How many does she have left?



Answer: ____ eggs

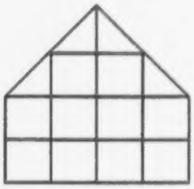
★★★ 2. Find the two that come next in each pattern.

a. B, D, F, H, J, ____, ____

b. 📖✏📖☎📖✏📖☎📖✏📖☎📖___ ___

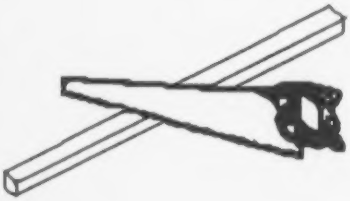
c. 79, 74, 69, 64, 59, ___, ___

★★ 3. The area of a figure is the number of unit squares it would take to make the figure. What is the area of this figure using □ as the unit square? (Hint: Don't forget to count the half squares too!)



Answer: _____ □'s

★★★ 4. It took Marie 10 minutes to saw a board into 2 pieces. If she works just as fast, how long will it take her to saw another board into 3 pieces?



Answer: _____ minutes

★★★ 5. Annie, Baldwin, and Carl each wear a number on their shirts. The numbers are 34, 25, and 18. Use the clues. Find each child's number.

Clues:

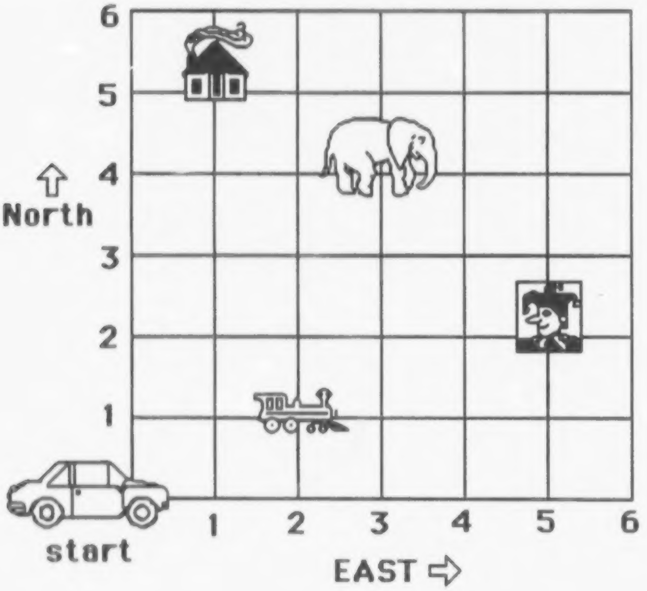
- The boys wear *even* numbers on their shirts.
- The sum of the digits in Baldwin's number is 7.

Answer: Annie's number is ____.
Baldwin's number is ____.
Carl's number is ____.

★★★ 6. The taxi moves from *start* to another point by going east first, and then north. It gets to the house by going 1 block east, and then 5 blocks north. Follow the taxi's path with your finger. The taxi driver's secret code for the house is (1,5).

Write the secret codes for these places:

a. clown: (__,__) b. train: (__,__) c. elephant: (__,__)



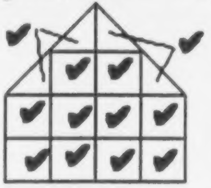
Commentary

Earth, VI

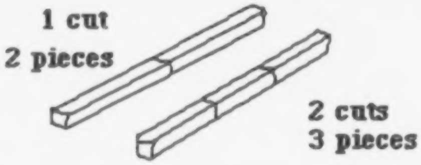
1. **(15)** Students might first add 9 and 12 and then subtract 6, or they might realize that only half a dozen, 6, needs to be added to 9. Some students might not know what a dozen means, but having the egg carton shown should be a hint. Most students will intuitively know what "half" means in this situation, and can count half the eggs shown for "half a dozen."

2. **(a. L, N; b. ✏📖; c. 54, 49)** In pattern a, the pattern skips one letter each time. In pattern b, the book, pencil, book, phone pattern repeats. In pattern c, 5 is subtracted from the previous number each time. In the last pattern, some students might get the answer by the rhythmic count of numbers that end in 9 followed by numbers that end in 4, working backward through the decades.

3. **(12)** The concept of area in this problem includes "half-squares." It is helpful for students to use figures where the halves fit together to make another whole unit square rather than counting "half" each time. In the figure given, each ✔ is one whole unit square.



4. **(20 minutes)** It might be helpful for students to act it out or draw a sketch because some might think that two pieces would require two cuts. This should help them see that only two cuts are required, at ten minutes each, to get three pieces.



5. **(Annie: 25; Baldwin: 34; Carl: 18)** Students may use "guess-check-revise" or logical reasoning to solve this problem. If the boys have *even* numbers on their shirts, Annie must have the only *odd* numbered shirt. Baldwin's number must be even and have a sum of seven; the only number with these characteristics is 34. Carl's number then must be 18.

6. **(clown: (5,2); train: (2,1); elephant: (3,4))** It is important for students to realize to go east (right) first then go north (up) to locate points. For a student having trouble, have him/her trace the path with a finger.

SUNSHINE MATH
Earth, VII

*Name:*______________________
(This shows my own thinking.)

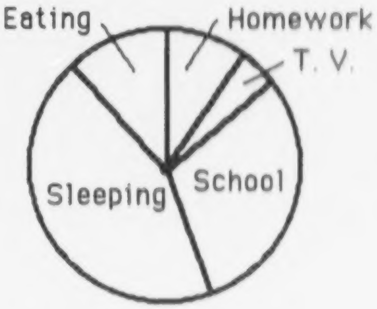
★★ 1. Sandy needed some stickers to give to her friends. Look at the chart below. How much do 6 stickers cost?

Number of Stickers:	1	2	3	4	5	6
Cost:	15¢	30¢	45¢			

Answer: _____¢

★★★ 2. Look at this circle graph to help answer each question.

How Pablo Spends His Time Each Day



a. What does Pablo spend the least time doing?

_____

b. What does Pablo spend the most time doing?

_____

c. Does Pablo spend more time eating, or watching TV?

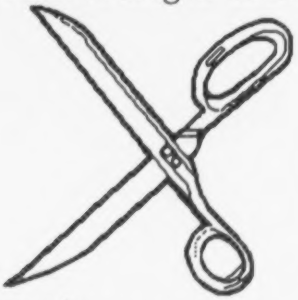
____

★ 3. Choose the correct sign: >, =, or < to make this number sentence true. Then circle your answer.

16 + 12 $\boxed{?}$ 23 + 4

Answer: > = <

★ 4. Draw a circle around an *angle* in the scissors below.



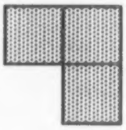
★★★ 5. Use each number only once. Do each step in order. Cross out the number when it is used.

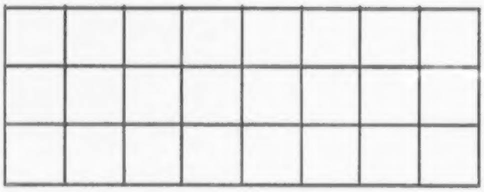
- Two numbers whose sum is 3
- Two numbers whose sum is 8
- Two numbers whose sum is 12
- Two numbers whose sum is 15

1	2	3
4	5	6
7	8	9

Circle the number left in the puzzle.

★★ 6. How many of these ➜ would it take to cover the grid below?

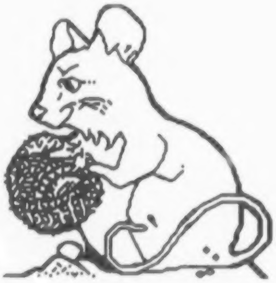




Answer: ___

★★ 7. Circle the best estimate for the length of the mouse's tail:

a. 5 centimeters
b. 10 centimeters
c. 2 centimeters
d. 13 centimeters



Commentary

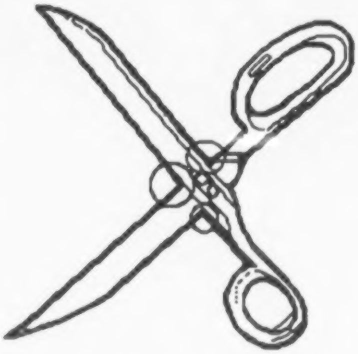
Earth, VII

1. **(90¢)** Students may identify the pattern as "adding on" 15¢ each time.

2. **(a. TV; b. sleeping; c. eating)** Students have an opportunity to work with a circle graph to answer each question. The answers are based on visual estimates of the size of one region as compared with another.

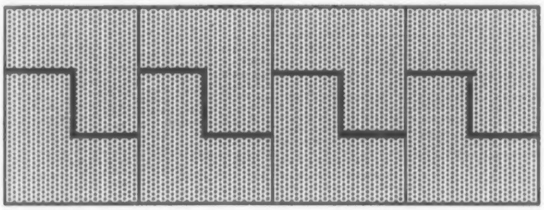
3. **(>)** 28 > 27

4. **(See below.)** The drawing to the right has several angles circled. Be a little generous with checking the paper. For example, if students circle a sharp point of the scissors, give them credit although technically part of the tip has a curved edge.



5. **(7)** Starting with the first clue and proceeding in order, the only numbers whose sum is 3 are 1 and 2, so mark them out. The only 2 numbers left whose sum is 8 are 3 and 5, so mark them out. The only 2 numbers left whose sum is 12 are 8 and 4, so mark them out. The only 2 numbers whose sum is 15 are 6 and 9, so mark them out. Seven is left.

6. **(8)** Students might be encouraged to cut out a shape like the one shown and physically move it around the grid to cover it. Such an arrangement is shown below.



7. **(5 centimeters)** Students might take a piece of string and curve it to fit the mouse's tail and then measure the string. They might try measuring with a straight-edge centimeter ruler -- if so, they might select 2 as the estimate unless they somehow "go around the curve" in small chunks. 10 and 13 centimeters should be obviously wrong.

SUNSHINE MATH
Earth, VIII

Name: ______________________________
(This shows my own thinking.)

★ 1. Look at the calendar. If today is January 21, how many Sundays have passed in this month?

Answer: ____ Sundays

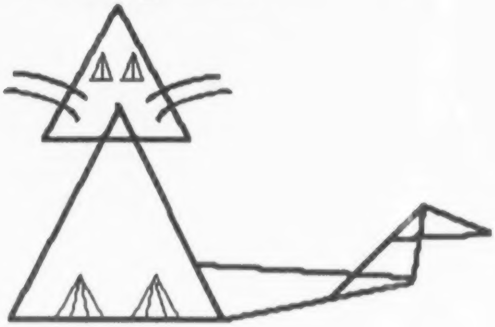
JANUARY

S	M	T	W	Th	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

★★★★ 2. How many triangles are in the cat picture?

Be careful .... There are more than 25!

Answer: ___ triangles



★★★ 3. Look at the pattern. Circle the letter under which the number 52 would go.

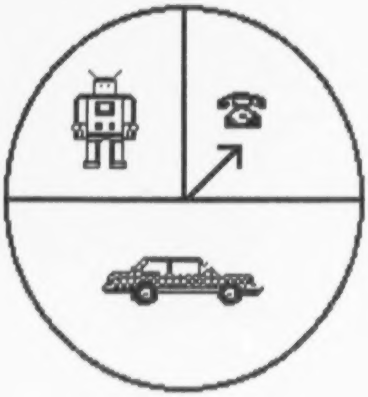
A	B	C	D	E
1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
.	.	.	.	.
.	.	.	.	.
.	.	.	.	.

★★ 4. Find the numbers that go in the boxes.

$$\begin{array}{r} 3\,\square\,5 \\ -\ 4\,\square \\ \hline \square\,2\,2 \end{array}$$

★★★ 5. David is going to spin the spinner for this game. What is the chance he will land on the telephone? Write the answer using a fraction.

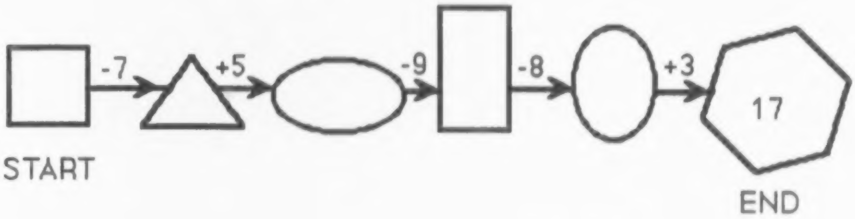
Answer: _____



★★★ 6. A fence has 6 poles from one end to the other. The poles are 10 feet apart. How long is the fence?

Answer:_____ feet

★★★★ 7. Write a number in each empty shape to complete the chain correctly.



Commentary

Earth, VIII

1. **(3)** January 21st is a Monday. Three Sundays have already passed in January: January 6, January 13, and January 20. The student can locate January 21, move backward a space to the Sunday column, and count backwards three Sundays in that month.

2. **(28)** The student must know what "triangle" means and also know that there are "overlapping" triangles in the drawing. There are 8 triangles in the cat's head --each eye contains 3; 13 triangles in the cat's body, and 7 triangles in the cat's tail: $8 + 13 + 7 = 28$ in the entire body.

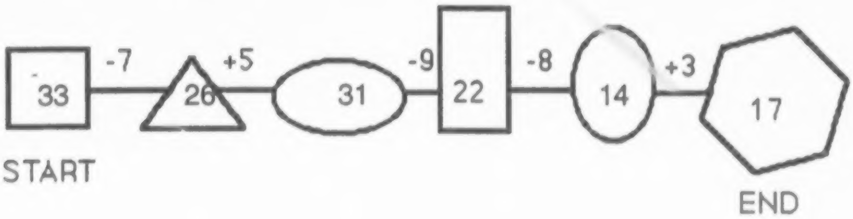
3. **(B)** The student may look for a pattern in several ways. The student may observe that column B contains only numbers that end in a 7 or a 2; a student may look at column E, mentally count to 50 and add 2 more; or the student may complete the chart to make a list.

4. **(3 6 5 - 4 3 = 3 2 2)** Start in the ones column. "Guess" a number and then "check" to see whether you are right. Then go to the tens column and "guess and check." End in the hundreds column. Continue "guessing and checking" until you find the right number. The student might "work backwards" by turning the subtraction situation into an addition one; for example, what plus two equals five? Three must go in the box; continue in this manner.

5. **($\frac{1}{4}$)** The car covers half of the circle; the robot and the telephone each cover $\frac{1}{2}$ of the half that is left, or $\frac{1}{4}$. The chance of landing on the telephone would be "1 out of 4" or $\frac{1}{4}$ written as a fraction.

6. **(50 feet)** It might be helpful to draw a picture. By drawing one "pole" or "dot" and then continuing until a total of 6 are drawn, one can understand that there are five spaces between the six poles. Each space is 10 feet so $10 + 10 + 10 + 10 + 10 = 50$ feet in all.

7. **(33, 26, 31, 22, 14 go in the shapes.)** The problem can be solved in several ways. In "guess-check-revise," try a number in the first box and calculate across; if the ending number is not correct, try another number in the first box -- higher if the answer was too low and lower if the answer was too high. Continue until the correct number is found. The student might "work backwards" by starting with the number known, 17, and asking what number when added to 3 gives 17? The number is 14; continue in this manner.



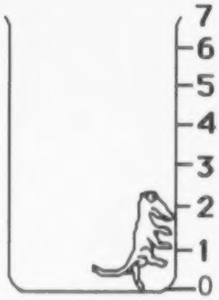
SUNSHINE MATH
Earth, IX

Name: ____________________________
(This shows my own thinking.)

★★★ 1. A lizard fell into a 7-foot hole. Each hour the lizard crawled 2 feet up, but then stopped for a moment to rest and fell back 1 foot. Then he climbed again. How many hours did it take for the lizard to get out of the hole?

Hint: Draw a picture of the lizard's trip.

Answer: ___ hours



★★ 2. How much time did Howard spend watching T. V.? Use the chart to help you.

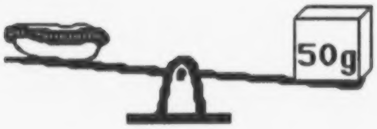
Howard's Saturday Schedule	
Play outside	8:30 - 11:15
Watch T.V.	11:15 - 12:15
Eat lunch	12:15 - 12:30
Watch T.V.	12:30 - 1:30
Play inside	1:30 - 5:00
Eat dinner	5:00 - 5:30
Watch T.V.	5:30 - 7:30

Answer:_____ hours

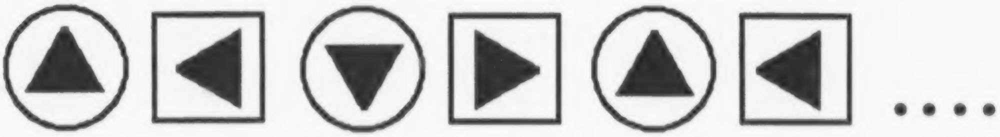
★★ 3. Ricardo earns $2.50 each week for his allowance. How much will he have at the end of four weeks?

★★ 4. What is the mass of the hot dog and bun? Circle your answer.

a. 50 grams
b. less than 50 grams
c. more than 50 grams

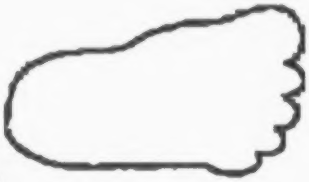


★★★★ 5. The pattern below repeats the same four figures. Draw the 15th figure in the pattern:

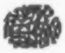


Answer: The 15th figure is:

★★ 6. Sam covered the baby's footprint with his thumb. About how many of Sam's thumb prints would it take to cover this foot shape?

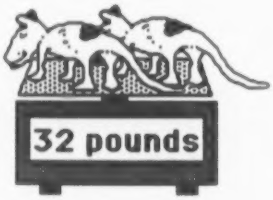


Sam's thumb print:



Answer: about ____ thumb prints

★★★ 7. Maria weighed her two identical puppies. How much did each puppy weigh?



Answer: ____ pounds

Commentary

Earth, IX

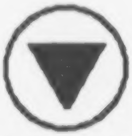
1. **(6 hours)** It is helpful to draw a picture of the lizard's trip. At hour 1, the lizard started at 0, went up to 2, and down to 1. At hour 2, the lizard started at 1, went up to 3, and down to 2. At hour 3, the lizard started at 2, went up to 4, and down to 3. At hour 4, the lizard started at 3, went up to 5, and down to 4. At hour 5, the lizard started at 4, went up to 6, and down to 5. At hour 6, the lizard started at 5, went up to 7, and climbed out!

2. **(4 hours)** The essence of this problem is to know that Howard watches T.V. from 11:15 to 12:15, from 12:30 to 1:30, and from 5:30 to 7:30. The first and second times he watched for an hour each, and the third time for 2 hours, totalling 4 hours in all.

3. **($10)** Students can use calculators, but many will not need them. Intuitively they can add $2.50 to itself to get $5, twice, and $5 + $5 is $10. It would be interesting to see the other strategies that students use on this problem.

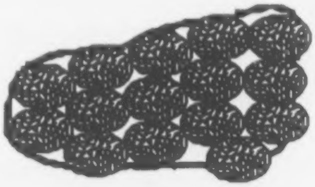
4. **(b. less than 50 grams)** If the hot dog and bun were exactly 50 grams, the scale would be even. Since the 50 gram weight is lower it must be heavier. Therefore, the hot dog and bun must be less than 50 grams.

5.



The pattern repeats after every four figures. The 15th figure, then, will be identical to the 3rd figure. Some students will recognize this, but some may need to draw each figure out to the 15th.

6. **(accept between 13 and 20 as an answer.)** The figure below shows 15 thumb prints, which cover the footprint but with some "holes." The problem should encourage estimation since an exact answer can't be obtained by the students.



7. **(16)** Since students do not know how to divide yet, they will try a number of different strategies to find the answer. One is to ask yourself "what number taken twice will give a sum of 32?" Students might try a few numbers and see.

SUNSHINE MATH
Earth, X

Name: ______________________
(This shows my own thinking.)

★ 1. Vilma turned 16 years old in 1995. In what year was she born?

Answer:_____

★★ 2. Find a number greater than 6,285 and less than 6,582. Use these numbers.

2	5	8	6

Answer: The number is _____

★★ 3. Look at the graph. Answer both questions.

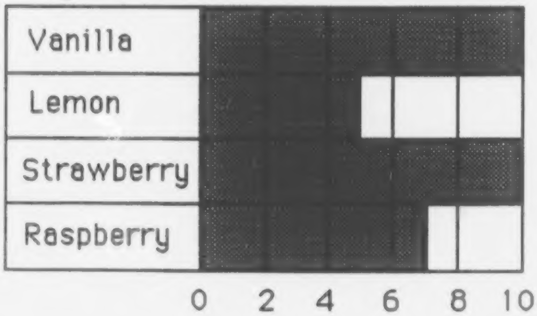
a. How many like raspberry?

____

b. How many like either lemon or strawberry?

____

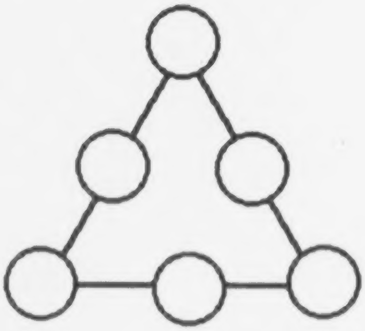
Yogurt Second Graders Like



★★★ 4. I am thinking of two numbers that add to twenty-one. One number is 3 more than the other. What are my numbers?

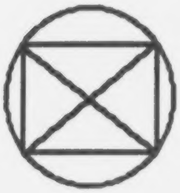
Answer:_____ and _____

★★ 5. Place 1, 2, 3, 4, 5, and 6 in the circles so each side of the triangle has the sum of 11.

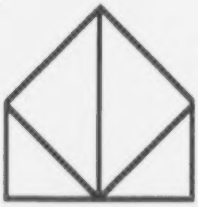


★★ 6. Which one of these shapes can be drawn without lifting your pencil or going over the same line twice? Circle it.

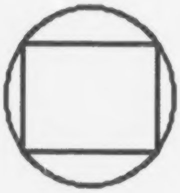
a.



b.

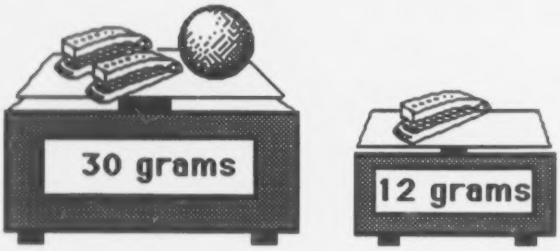


c.



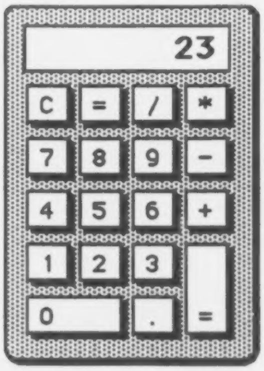
★★★★ 7. How much does the ball weigh?

Answer: ___ grams



★★★ 8. Henrique pressed the keys $\boxed{5}$, $\boxed{=}$, $\boxed{1}$, $\boxed{8}$, and $\boxed{+}$ on his calculator, but not in that order. He got the answer 23. What problem did he do?

Answer: ________



Commentary

Earth, X

1. **(1979)** Subtract 16 from 1995 and get 1979. Or, a student might be successful by counting backwards 16 times from 1995.

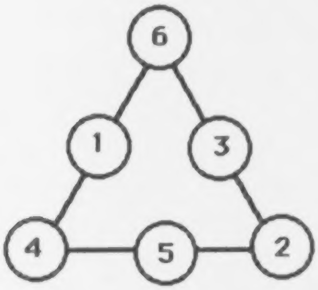
2. **(6,528)** This problem can be solved using the "guess-check-revise" method, using the numbers given: 2, 5, 8, and 6. Students might put these four numbers on index cards and physically move them around until they find the right combination. The number has to begin with 6, so that card would stay stationary while the student moves the other three.

3. **(a. 7; b. 15)** In part (a), note that the graph is shaded halfway between 6 and 8 indicating that 7 like raspberry. In part (b), 5 second graders like lemon and 10 like strawberry for a total of 15. Students who have not seen graphs in which all of the numbers are shown on the bottom axis might have difficulty with the problem for that reason.

4. **(9 and 12)** There are several ways to approach this problem. One way is to use "guess and check" until you have the correct pair of numbers. Another way is to make a list of pairs of numbers that equal 21:

1 + 20
2 + 19
3 + 18
4 + 17
5 + 16
6 + 15
7 + 14
8 + 13
9 + 12 -- only this pair differs by 3
10 + 11

5. **(see below)** Some students may use " guess and check" until they find the right combinations for 11. Note that the three sides of the triangle can be switched around.



6. **(c should be circled)** Notice that the last figure has 4 vertices (points where the paths meet), and that each has an even number of paths coming out of it. Network such as these are *traceable* if they have exactly 0 or 2 odd vertices. This network has 0 odd vertices, since all four vertices have an even number of paths coming out of them.

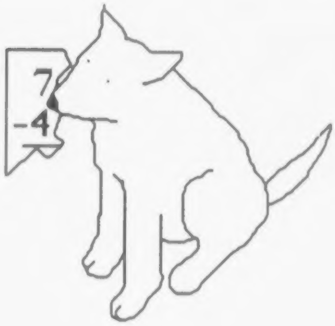
7. **(6)** Students can see that a stapler weighs 12 grams from the smaller scale. Therefore on the larger scale, the two staplers weigh 24 grams. Since the entire weight is 30 grams on the big scale, the ball must weigh the difference between 30 and 24, which is 6.

8. **(15 + 8 = 23)** Other possibilities are 18 + 5 = 23; 5 + 18 = 23; or 8 + 15 = 23. Students can again take five index cards, label them =, 5, 1, 8, and +, and arrange them to give 23 as an answer.

SUNSHINE MATH
Earth, XI

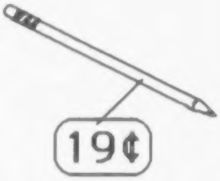
*Name:*______________________________
(This shows my own thinking.)

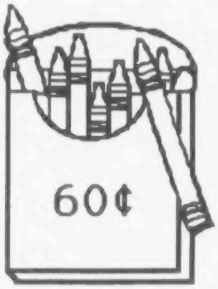
★ 1. Sam's dog chewed a hole in his homework. Now he cannot see the numbers in the ones place. Circle the best estimate using the numbers you can see.



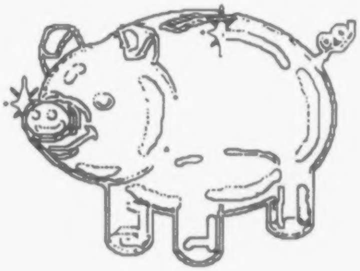
about 50   about 30   about 110

★★★ 2. Maria has 3 quarters, 1 dime, and 2 nickels. She wants to buy the crayons and pencil. Does she have enough money? Circle your answer.
Answer: yes   no



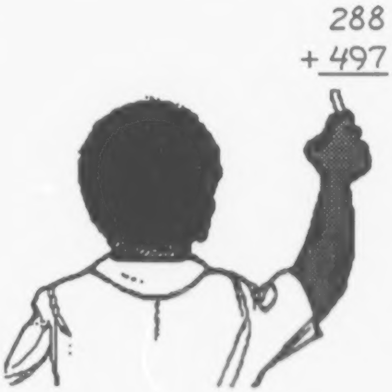


★★ 3. If you put a quarter a day into your piggy bank, how much money would you have in a week?
Answer: _____



★ 4. Herrick was asked to estimate the answer to this problem. Circle the best estimate below.

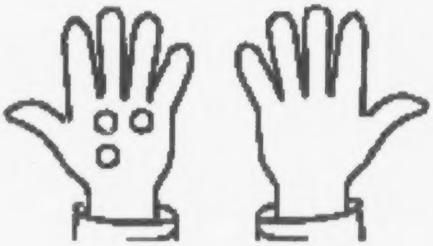
600   700   800



★★★ 5. Find the pattern. Fill in each blank.

___, ___, 69, 71, 73, 75, ___

★★ 6. Draw twice as many rocks in the right hand, as are in the left hand. Now how many more fingers are there, than rocks?



Answer: ___ more fingers

★★★★ 7. Use the calendar to answer these questions:

a. Whose birthday is September 17?

____

b. When is Tim's birthday?

____

c. Who has a birthday on Monday?

____

d. How many Fridays are in this month?

______

September						
Sun	**Mon**	**Tue**	**Wed**	**Thur**	**Fri**	**Sat**
				1	2	3
4	5	6	🎂 Jay	8	9	10
11	🎂 John	13	14	15	16	🎂 Lee
18	19	20	🎂 Tim	22	23	24
25	26	27	28	29	30	

★★ **8.** What is the starting number?

$\boxed{\text{starting number}} \rightarrow \boxed{\text{add 3}} \rightarrow \boxed{\text{subtract 5}} \rightarrow 10$

Answer: The starting number is _____.

Commentary

Earth, XI

1. **(about 30)** Subtracting "forty something" from "70 something" might give about 30. It couldn't give a number close to 50, as 79 – 40 would give the highest difference, 39. Likewise, "about 110" is unreasonable, although some students might get it by adding instead of subtracting.

2. **(Yes)** The cost of the two items is 79¢. Maria has 95¢. She has enough money to buy both. Students might want to count her money using real coins or use a calculator.

3. **($1.75)** Students need to know that a week has seven days. Some students might know the answer is 7 quarters, but not know how to convert that amount into dollars and cents. Give them 1 star for such an answer.

4. **(800)** Students should use their intuition that 288 is close to 300, and 497 is close to 500, and 300 plus 500 is 800.

5. **(65, 67, 69, 71, 73, 75, 77)** Students should see the pattern of counting by 2.

6. **(1)** Students should draw 6 rocks in the right hand, giving a total of nine. This is one less than 10 fingers.

7. **(a. Lee; b. Sept. 21; c. John; d. 5)** Students who are familiar with a calendar should have no difficulty with this problem.

8. **(12)** Students may solve this by *working backwards* or by *guess-check-revise*. To work backwards, they start at the end number, 10, and ask themselves what the previous number would have to be so that, when 5 is subtracted, 10 is left. They would get 15 as the next-to-last number. Then they would work backwards again by asking what number, when 3 is added, gives 15. That number is 12, which is the starting number. To guess-check-revise, students would simply guess a starting number and do the arithmetic. If that wasn't correct, they would guess a different starting number, either higher or lower than the first, based on what happened with the first.

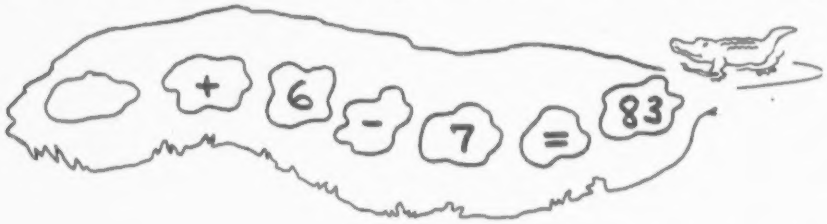
SUNSHINE MATH
Earth, XII

*Name:*____________________________
(This shows my own thinking.)

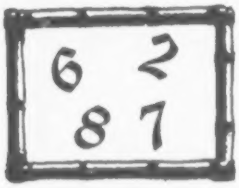
★★ 1. Bill found 7 snakes and 16 frogs on Saturday. That night 3 of the snakes and 12 of the frogs escaped into the woods. How many animals did Bill have left?

Answer: _____ animals

★★★★ 2. Help Crocky, the baby crocodile, travel across the pond. Fill in the missing number on the first lily pad.

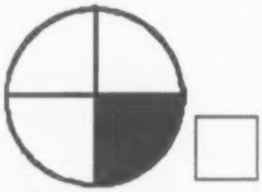


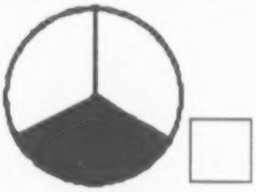
★ 3. How many different 2-digit numerals can be made from the digits below? Do not count 22, 66, 77, and 88.

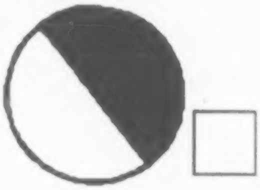


Answer: There are ____ 2-digit numerals that can be made from those shown to the left.

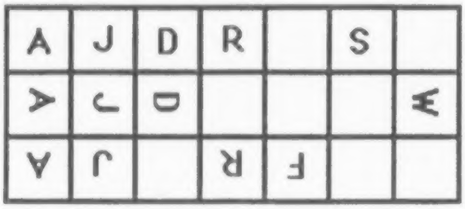
★ 4. Show the fraction of each circle that is shaded in. Put the fraction in the box beside the circle.



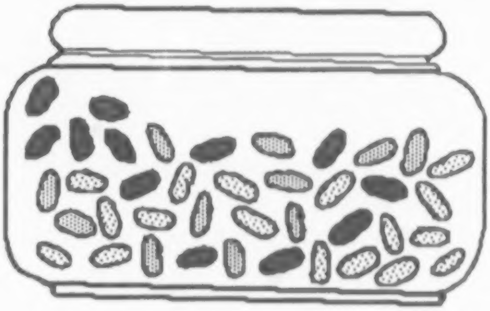




★★ 5. Write the missing letters in the empty boxes below. Be sure to write them in the position that follows the pattern.



★ 6. Count the jelly beans in the jar. Is the total number of jelly beans an *odd* number, or an *even* number?



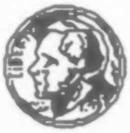
Answer:
There are _____ jellybeans.
This is an ______ number.

★ 7. How many minutes in 2 hours?

Answer: ____ minutes

★★★ 8. The Jones children got a dime each day they made up their beds. One week Marsha earned 40¢, Danny earned 50¢, Molly earned 40¢, and Bruce earned 20¢. Make a pictograph to show how much money each child earned.

Marsha:
Danny:
Molly:
Bruce:

Key:  = ○

Commentary

Earth, XII

1. **(8)** Students may use several strategies to solve this problem. They might total all the animals found, then subtract all that escaped. Or they might subtract the number of each type that escaped from the total of that type, and add the remaining animals. Drawing a picture would help, and then the answer can be found by counting.

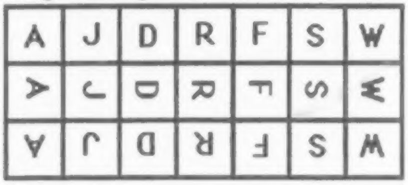
2. **(84)** There are two ways to solve this problem. Under *guess-check-revise*, you would "guess" a number and check to see whether it is right. If not, revise your guess until the solution is found. For *working backwards*, the student starts with the answer 83 and asks "what was the previous number so that, after 7 is subtracted, 83 is left?" The number is 90. Then work backwards on the previous step asking, "what number did I start with so that, after adding 6, I got 90?" The number is 84. Still a third way to approach the problem is to notice that 6 is added and 7 is subtracted in the middle of the pond, meaning a total of 1 is subtracted. So the problem becomes, "what number do I start with, so that when 1 is subtracted, 83 is left?"

3. **(12)** Students can be encouraged to solve this problem by making an organized list -- 26, 27, 28, 62, 67, 68, 72, 76, 78, 82, 87, 88. Notice the list starts with the smallest number, a 26, and then lists all the others that start with 2 in the tens place. Then the list moves to the next largest number in the tens place, and so on.

4. **(first circle: $\frac{1}{4}$; second: $\frac{1}{3}$; third: $\frac{1}{2}$)**

Through observation or using concrete examples, students should realize that there is one out of four equal parts shaded in the first circle; there is one out of three equal parts shaded in the second circle; and there is one out of two equal parts shaded in the last circle.

5. **(see below)** Visual discrimination is involved in solving this problem. Each letter in the top row is turned 90 degrees to get the letter below it, and another 90 degrees to get the third entry.



6. **(40; even)** Students can learn to count such collections by "counting by twos." If they do so, the collection is *even* if they can count the whole set and end on one of their counting-by-twos numbers. The collection is *odd* if they have one left over when counting by twos.

7. **(120 minutes)** 60 minutes in an hour + 60 minutes in an hour = 120 minutes in 2 hours.

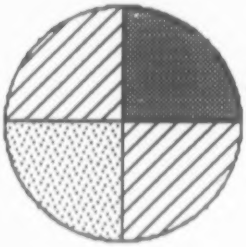
8. **(see below)** Students have a chance to make their own pictographs in this problem. They will have to think of the money earned as dimes (for example 40¢ is 4 dimes).

Marsha: ○○○○
Danny: ○○○○○
Molly: ○○○○
Bruce: ○○

SUNSHINE MATH
Earth, XIII

*Name:*__________________________
(This shows my own thinking.)

★★ 1. If you throw a dart at this dartboard, what is the chance you will land on stripes? Write the answer as a fraction.



Answer: My chance is ☐

★★★ 2. Read the list of numbers. Choose only the *even* numbers and add them together. What is the sum?

fourteen
thirty-seven
twenty-nine
eleven
one hundred
forty-three
eighty-eight
sixteen

Answer: ________

★★ 3. Complete the addition problems. Write numbers in the boxes.

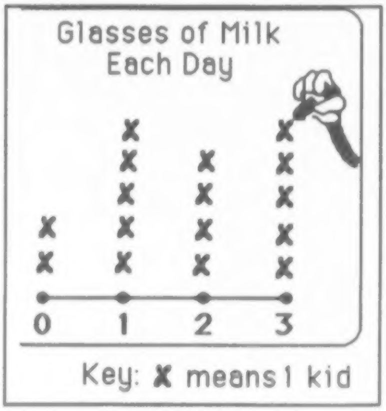
a.
$$\begin{array}{r} 3\;\square\;2 \\ +\;\square\;0\;\square \\ \hline 6\;\;5\;\;3 \end{array}$$

b.
$$\begin{array}{r} \square\;2\;\square \\ +\;2\;\square\;3 \\ \hline 7\;\;6\;\;8 \end{array}$$

★ 4. Carolla is older than Tremaine. Carolla is younger than James. Who is the oldest?

Answer: ______

★★★★ 5. Mickey Mouse asked 16 children how many glasses of milk they drink each day. He then made this line plot. Answer the questions below.



a. How many children drink 1 glass of milk each day?

Answer:_____ children

b. Four children drink 2 glasses of milk each day. How many total glasses of milk is this each day?

Answer: _____ glasses

c. Five children drink 3 glasses of milk each day. How many total glasses of milk is this each day?

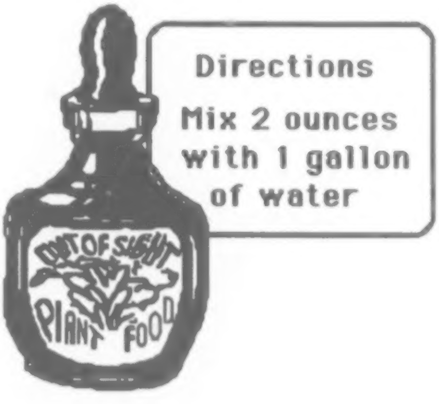
Answer: ____ glasses

d. How many total glasses of milk do all 16 children drink each day?

Answer: _____ glasses

★ 6. How many ounces of plant food does Marcus need to mix with 3 gallons of water?

Answer: ____ ounces


Directions
Mix 2 ounces with 1 gallon of water
OUT OF SIGHT
PLANT FOOD

Commentary

Earth, XIII

1. **(1/2 or 2/4)** 2 out of 4 equal-size parts or 1/2 of the circle is stripes. Students are equating the area of parts of a figure with the probability of landing on that area.

2. **(218)** The *even* numbers are: 14, 88, 100, and 16. Students might want to remember that the even numbers are the ones you would say aloud if you counted by twos. They could count by twos, from 2 to 100, and check off each of the numbers given if they called out its name.

3. **(a.** $\begin{array}{r} 352 \\ +\,\underline{301} \\ 653 \end{array}$ **b.** $\begin{array}{r} 525 \\ +\,\underline{243} \\ 768 \end{array}$**)** Students may solve these problems by turning each box in a column into a missing addend problem.

4. **(James)** Students may "act out" the problem to help solve it, draw a diagram, or make a list. To make a list, they would put Carolla on top of Tremaine to indicate Carolla is older, and then put James above Carolla for the same reason. Then James would be on top, Carolla next, and Tremaine last, indicating the order of their ages.

5. **(a. 5; b. 8; c. 15; d. 28)** The line plot may be new to students, but the key should help them realize it is somewhat like a pictogram. Two students drink no milk, five drink 1 glass, four drink 2 glasses, and five drink 3 glasses each day.

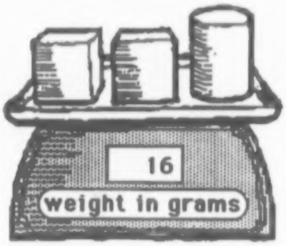
6. **(6)** Students may see this pattern in a real-world situation: 1 gallon = 2 ounces, 2 gallons = 4 ounces, and 3 gallons = 6 ounces. This is an introduction to ratio, but at this stage can be thought of as a pattern problem, a repeated addition problem, or simply a counting problem.

SUNSHINE MATH
Earth, XIV

*Name:*____________________________
(This shows my own thinking.)

★★ 1. A block weighs 4 grams. How much does a can weigh?

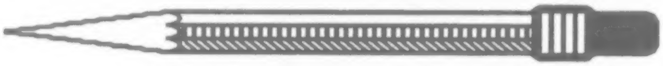
Answer: ____ grams



★★★ 2. Write the correct number in the ☐ .

a. ☐ + 6 = 11 b. 28 - ☐ = 10 c. ☐ - 5 = 44

★ 3. This piece of paper is $8\frac{1}{2}$ inches wide. Use this information to estimate the length of the pencil below. Ring the best estimate.



Best estimate: 6 inches or 10 inches or 4 inches

★★ 4. Every letter of the alphabet has a money value:

A=\$1	E=\$1	I=\$1	M=\$1	Q=\$1	U=\$1	Y=\$1
B=\$2	F=\$2	J=\$2	N=\$2	R=\$2	V=\$2	Z=\$2
C=\$1	G=\$1	K=\$1	O=\$1	S=\$1	W=\$1	
D=\$2	H=\$2	L=\$2	P=\$2	T=\$2	X=\$2	

What is the money value of: "I love Math?" \$________

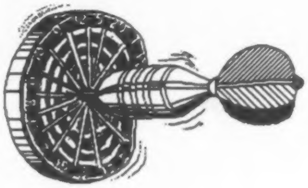
★ 5. The movie begins at 2:30 p.m. It runs for $2\frac{1}{2}$ hours. What time will the movie be over?

Answer: ______ p.m.

★★★ 6. Five students played darts. The chart shows the points for the first turn.

Score on Turn 1

Name	*Points*
Lisa	2
John	7
Fran	10
Micky	5
Suki	7



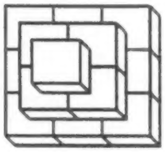
a. John outscored Lisa by how many points? ______

b. The team of Lisa, Fran, and Suki outscored the team of John and Micky by how many points?____

c. Suki had a total of 12 points after her second turn. How many points did she score on her second turn?

______

★★★ 7. Use cubes to make this figure. Write how many cubes there are.



Answer: _____ cubes

★★ 8. Find the answer to this problem by using a calculator.

11004 - 3269

Turn the calculator upside down.

What word does it spell? ____________

Commentary

Earth, XIV

1. **(8)** If one cube weighs 4 grams, 2 cubes weigh 8 grams. The scale reads 16 grams, so the can (cylinder) must weigh 8 grams.

2. **(a. 5; b. 18; c. 49)** Students may find the missing number by asking themselves "what number could the box be covering so that the sentence is true?" They would try different numbers and check to see whether they are correct. Some students might turn the problem into a different but related problem; for example, addition to subtraction or vice-versa. For (a), they might find 11 – 6; for (b), 28 – 10; for (c), 44 + 5.

3. **(C. 4 inches)** This problem might be solved with only visual estimation skills, but it may also be solved by physical means. Students might spread their fingers apart the same distance as the pencil is long, and then see that they can put their outstretched fingers about two times across the sheet of paper. Or, they might mark the pencil's length on another sheet of paper and move the marks in the same manner as their fingers. The pencil is about one-half the width of the paper.

4. **($13)** I L O V E M A T H
$1 + $2 + $1 + $2 + $1 + $1 + $1 + $2 + $2 = $13

5. **(5:00 p.m.)** Students need to know how to read and write time to the half hour, and to know that 1/2 hour is 30 minutes. They might proceed be adding the 2 1/2 hours in "chunks." For example, they might start at 2:30, add 1 hour to get 3:30, then another hour to get 4:30, then the last half hour to get 5:00.

6. **(a. 5; b. 7; c. 5)** Part (a) involves reading the chart correctly, then subtracting Lisa's 2 points from John's 7. Part (b) involves adding the player's scores for each team, and then subtracting 12 from 19. Part (c) involves thinking about the second turn, and subtracting from that total what Suki had on the first turn.

7. **(14 cubes)** Again, visual skills are necessary for this problem. Student should realize that they are looking at a 3-dimensional picture. There are 9 cubes on the base, 4 in the middle, and one at the top.

8. **(SELL)** 11004 – 3269 = 7735, which, turned upside down, spells "SELL".

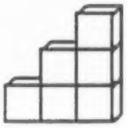
SUNSHINE MATH
Earth, XV

*Name:*______________________________
(This shows my own thinking.)

★★ 1. There were 27 children and 18 adults at the picnic. Twelve of the children were in the egg-toss contest. How many children were *not* in the egg-toss contest?

Answer: ____ children

★★★ 2. Below are some stairs made of cubes. The highest step is 3 cubes high. It takes 6 cubes to make these stairs. How many cubes would it take to make stairs if the highest step was 5 cubes high?



Answer: _____ cubes

★★★ 3. The school library keeps a record of how many books are checked out. Use the chart to answer the following questions.

Daily book chart	
Monday	12
Tuesday	15
Wednesday	10
Thursday	21
Friday	11

a. On what day were the most books read? _______

b. On what day were 11 books read? ___________

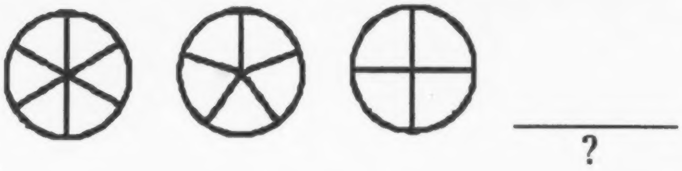
c. On what two days was a total of 25 books read?
___________ and _____________

★★★ 4. Draw the 17th picture in this pattern in the box:
✈ ❤ ◆ ✈ ◆ ❤ ✈ ❤ ◆ ✈ ◆ ❤ ✈ ❤ ◆ ✈ ☐

★★★★ 5. Fill-in the chart to show the different ways to have 15¢. One way – with 15 pennies – has been done for you.

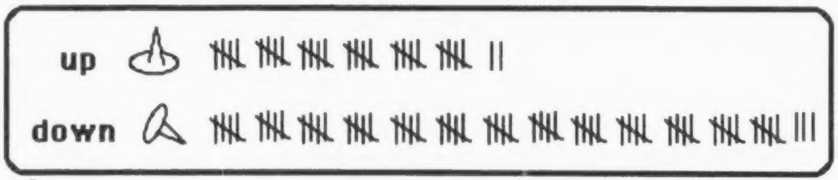
Pennies	Nickels	Dimes
15	0	0

★ 6. Draw what comes next in this pattern.



★★★★ 7. Maria dropped a thumb tack 100 times. Her results are shown in the chart. What is the best judgement she can make about dropping a thumb tack? Check your choice.

☐ It is more likely to land up than down.
☐ It is more likely to land down than up.
☐ It is just as likely to land down as up.



★★★ 8. Write the operation and the number that will get you to the next number.

Example: **Given**

5		12

You write

5	+7	12

Problem:

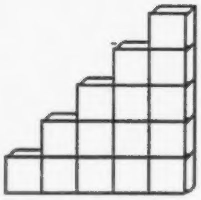
6		10		7		11		19

Commentary

Earth, XV

1. **(15)** The problem is one with extraneous information. Many students want to do something -- add or subtract -- the numbers 27 and 18, because those are easily recognized. These students might be encouraged to draw a diagram of the kids and the adults, including 12 kids in the egg-toss contest.

2. **(15)** Students can either make the next two sets of steps in the pattern to get one five steps high, or they can draw it and count. Such a set is shown to the right.



3. **(a. Thursday; b. Friday; c. Tuesday and Wednesday)** For part a, 21 is the highest number, so the day must be Thursday. For part b, find "11" on the chart, look across and see Friday. For part c, 15 + 10 = 25, so Tuesday and Wednesday is correct.

4. **(◆)** Let *p* stand for plane, *h* for heart, and *d* for diamond. The pattern repeats every six times: *p, h, d, p, d, h,* etc. Some students will think of the pattern as one which repeats after three figures, with the 2nd and 3rd figures (heart, diamond) alternating which comes first.

5.

Pennies	Nickels	Dimes
15	0	0
10	1	0
5	2	0
5	0	1
0	3	0
0	1	1

These can be in any order. Encourage students to make combinations of real dimes, nickels, and pennies to fill in the chart.

6. **(The circle is cut into thirds.)** Students may see the pattern as the first circle cut into sixths, the second circle cut into fifths, the third circle cut into fourths, and the next circle cut into thirds.

7. **(b)** It is more likely to land *down* than *up*. The thumbtack landed *down* 68 times; it landed *up* only 32 times. It seems likely from this experiment to land *down* about twice as often as *up*.

8. **(see below)**

6	+4	10	-3	7	+4	11	+8	19

SUNSHINE MATH
Earth, XVI

*Name:*________________________
(This shows my own thinking.)

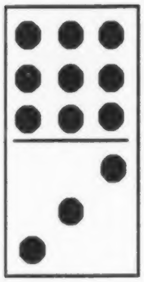
★★★ 1. Tanya has 60¢ in dimes and nickels. She has the same number of dimes as nickels. How many of each does she have?

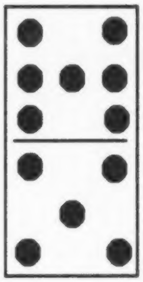
Answer: ______ dimes and ______ nickels

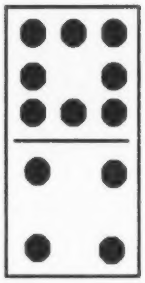
★ 2. 47 pigs ran a race. 21 of them did not finish the race. How many pigs finished?

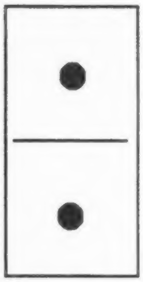
Answer: ________ pigs

★★ 3. Name the domino that matches all of the clues below:


A


B

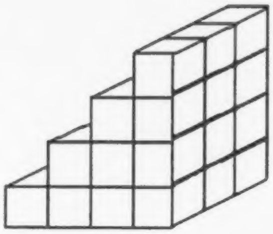

C


D

- ▲ I have 12 dots.
- ▲ There is an odd number of dots at each end.
- ▲ I have at least 4 dots on each end.

Answer: ______

★★ 4. How many cubes does it take to make these steps? Each step is 3 blocks wide.



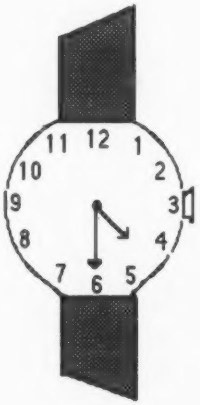
Answer: _____ cubes

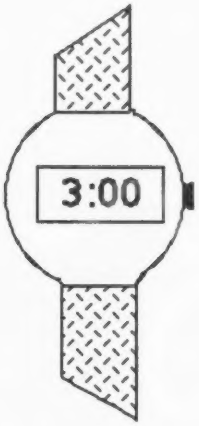
★★★ 5. Sue, George and Rose are learning to tell time. They have brand new watches. Match the letter of the person with his/her watch.

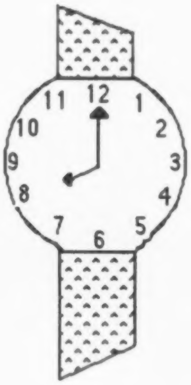
a. Sue said, " It is time to go home from school."

b. George said, "It is time for school to start."

c. Rose said, "It is 4:30 and time for soccer practice."







Answers: ______ ______ ______

★★★★ 6. Taffy had 3 female puppies. Two years later each puppy had 3 puppies herself. How many grandpuppies did Taffy have? ______

Commentary

Earth, XVI

1. **(4 dimes and 4 nickels)** Students might just start by *guess and check*. Or they might realize that 1 dime and 1 nickel is 15¢, then double that and get 2 dimes and 2 nickels at 30¢, double that and have 4 dimes and 4 nickels at 60¢.

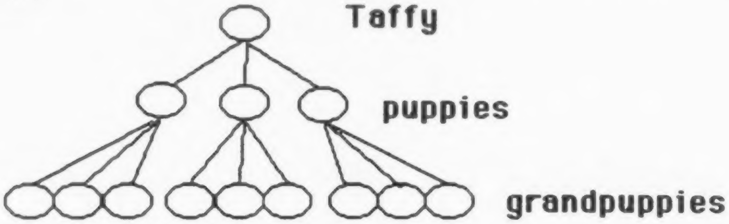
2. **(26)** Subtract the 21 pigs who did not finish the race from the total number of pigs, 47, to find out how many pigs *did* finish the race.

3. **(B)** Domino D is eliminated by the first clue, C by the second clue, and A by the third. Therefore by *process of elimination*, B is the only one that fits all the clues. Students should begin looking at such problems in the future as being solved by *process of elimination*.

4. **(30)** The bottom layer of the steps is 4 cubes by 3 cubes or 12 cubes. The layer next to the bottom is 3 cubes by 3 cubes or 9 cubes. The layer next to the top is 2 cubes by 3 cubes or 6 cubes. The top layer is 3 cubes. 3 + 6 + 9 + 12 = 30. Students might be encouraged to actually build such a set of steps using Unifix cubes or sugar cubes.

5. **(Rose, Sue, George)** The first clock shows 4:30 which is a reasonable time for soccer practice, where Rose was headed. The second clock shows 3:00 which is time school might get out, as Sue mentions. The third clock has 8:00, which is a reasonable time for school to begin.

6. **(9)** Drawing a diagram will help solve this problem. A drawing such as the one below will help. Notice that the drawing doesn't try to show a dog itself, but rather has the thought processes represented.



SUNSHINE MATH
Earth, XVII

*Name:*__________________________
(This shows my own thinking.)

★ 1. Kamisha is a traveling salesperson. In two months, she traveled *eighty hundred* miles. How many *thousand* miles did Kamisha travel?

Answer: _______ thousands

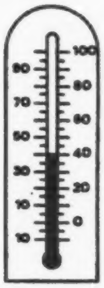
★★★★ 2. Use a calculator to do each problem below:

25 + 48 + 65 = ____
103 + 22 + 79 = ____
85 - 38 + 26 = ____
219 + 36 - 95 = ____

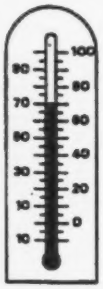
★★ 3. Cindy's mother had four eggs. She bought a dozen more and used up half a dozen making brownies. How many eggs does she have left?

Answer: _______ eggs

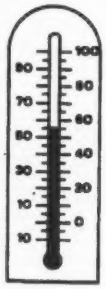
★★★ 4. Write the temperature shown on each thermometer. Put your answer on the line beside the the thermometer.


100
80
70
80
60
50
40
30
20
10
0
10

__°C


100
80
70
80
60
50
40
30
20
10
0
10

__°C


100
80
70
80
60
50
40
30
20
10
0
10

__°C

★★★★ 5. Pet's Pleasure is the only dog food Honey will eat. It is sold in packages that contain 6 servings. Honey eats 5 packages a month, How many servings of Pet's Pleasure does she eat?

Answer: ____ servings

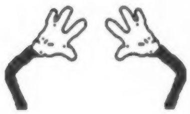
★★ 6. This table shows bowling scores for four months.

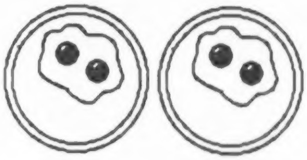
	Sally	Saul	Sal
June	141	189	176
July	187	198	211
Aug.	175	131	185
Sept.	146	165	186

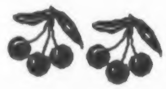
If the scores were rounded to the nearest hundred, during which month would *each* bowler have a 200 average? _____

★★★ 7. I am less than 20 years old. Count by 3's and you say my age. Count by 5's and say my age. How old am I? _____

★★★8. A *doubles fact* means a number is added to itself. 2 + 2 = 4 and 5 + 5 = 10 are *doubles facts*. Write the *doubles fact* for each picture below:







________ ________ ________

Commentary

Earth, XVII

1. **(8 thousand)** Eighty hundreds is 80 starting in the hundreds place or 8,000.

2. **(138, 204, 73, 160)** Students will probably have no trouble with the top two problems, but some might have trouble with the latter two since they involve subtraction. They should be encouraged to check their work by rounding the numbers and mentally doing the problem with easy numbers, to see whether the calculator answer is close enough to assume they didn't make a mistake.

3. **(10 eggs)** The problem involves two steps, and knowing that a dozen eggs is 12 eggs. Students might add 4 to 12 and then subtract 6, or they might draw a picture of the eggs and simply count.

4. **(40^{o} C; 70^{o} C; 55^{o} C)** Each line on the thermometer equals 5 degrees. The longer lines are multiples of 10. The shorter lines are multiples of 5. Students may have trouble reading between the marked lines for the third temperature.

5. **(30 servings)** 5 containers of dog food times 6 servings per container equals 30 servings. Students may also solve this by drawing a picture of each container with 6 servings in each. This may also be solved with repeated addition. 6 + 6 + 6 + 6 + 6 = 30

6. **(July)** 187 rounds to 200. 198 rounds to 200. 211 rounds to 200. All scores during the month of July will round to 200.

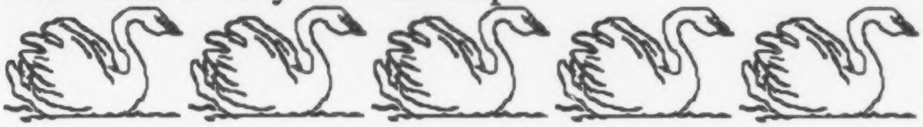
7. **(15)** When you count by 3's, you get 3, 6, 9, 12, 15, and 18. When you count by 5's, you get 5, 10, and 15. The number less than 20 that is found in both is 15.

8. **(4 + 4 = 8; 2 + 2 = 4; 3 + 3 = 6)** The answers given are the most common ones, but students might arrive at different answers by looking at the pictures differently. In the first picture, they might see 1 hand plus 1 hand, rather than 4 fingers plus 4 fingers. In the second picture, they may see 1 plate plus 1 plate, rather than 2 eggs plus 2 eggs.

SUNSHINE MATH
Earth, XVIII

*Name:*________________________
(This shows my own thinking.)

★★★ 1. Five swans are swimming in a line. Freida is ahead of Margie. Sandra is behind Margie. Billy is between Sandra and Margie. Clint follows Sandra. Label the swans below to show how they are lined up.

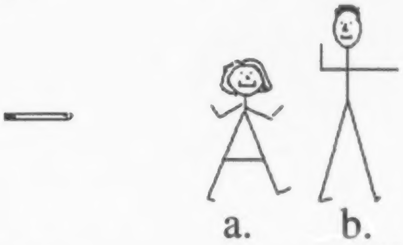


_______ _______ _______ _______ _______

★ 2. Marita's mom travels to different towns each day. She leaves at 4:00 a.m. and returns at 3:00 p.m. She traveled 50 miles on Monday morning and 20 miles Monday afternoon. How far did she go on Monday?

Answer: ________ miles

★★ 3. Use the pencil shown below as your unit of measure. Estimate how tall the figures are to the nearest whole pencil.



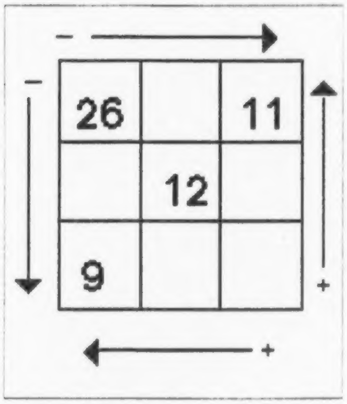
Answers: a. ________ pencils b. ________ pencils

★ 4. I had 34¢. I lost a dime. How much money do I have now?

Answer: _______ ¢

★★ 5. Finish filling in the box with numbers by adding and subtracting. Subtract and add in the directions shown by the arrows.

(Hint: In the top row, 15 goes between 26 and 11 since 26 - 15 = 11.)



26		11
	12	
9		

★★★★ 6. How many different two-digit numbers can you make from the digits below? Do not count double digits such as 88, 33, 22, and 55.

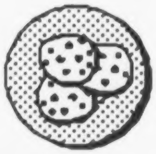
8 3 2 5

Answer: _____ two-digit numbers

★★★ 7. Tanya guessed there were 65 beans in a jar. Her guess was off by 20. Bryan guessed there were 35 beans in the jar. He was off by 10. How many beans are in the jar?

Answer: ________ beans

★★★ 8. Each cookie has 10 chocolate chips in it. How many chocolate chips are in a box of 25 cookies?



Answer: ______ cookies

Commentary

Earth, XVIII

1. **(from the left edge, Clint, Sandra, Billy, Margie, and Freida)** From the first clue, you don't know which swan is Freida -- all you know is the relative position. A good technique might be making cards with a name of a swan on each card and maneuvering the cards to fit the clues.

2. **(70)** This problem has information in it that is not necessary to solve the problem. Add the 50 miles to the 20 miles to get the answer of 70.

3. **(a. 2 b. 3)** Students will use different approaches to estimating this height. Some may do so visually, although it is somewhat difficult since the pencil is horizontal and the stick figure heights are vertical. Another method would be to find an object as long as the pencil and use that object repeatedly to estimate the height. Still another method would be to mark off the distance of the pencil on a piece of paper and use it repeatedly to determine an answer.

4. **(24¢)** Subtract a dime (10¢) from 34¢.

5.

26	15	11
17	12	5
9	3	6

6. **(12)** Students might make an organized list of the numbers. If one starts with 8 as the first digit and makes all possible two-digit numerals, then moves to 3 as the next first digit, and so on, the list would be: 83, 82, 85, 38, 35, 32, 28, 25, 23, 52, 53, and 58.

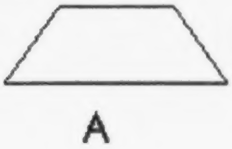
7. **(45)** From the first two sentences, students know that there are either 85 or 45 beans. From the third and fourth sentences, there must be either 45 or 25 beans. The number in common to both possibilities is 45.

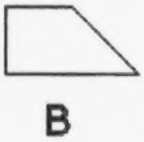
8. **(250)** Students will solve this problem in a number of ways. Some might draw all 25 cookies with the chips in each and simply count. Others will find an easier way, such as drawing 25 cookies and counting by tens. Others will try various ways of grouping the cookies. For example, since 10 cookies would have 100 chips, students might group by 10 cookies, 10 cookies, and another 5 cookies.

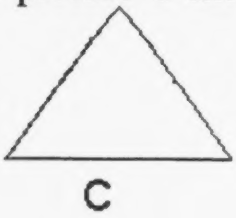
SUNSHINE MATH
Earth, XIX

*Name:*__________________________
(This shows my own thinking.)

★★★ 1. Draw lines to show equal parts. Divide pictures A and B into 3 equal parts. Divide picture C into 4 equal parts.


A


B


C

★★ 2. Press the keys below on your calculator. Record your answer on the line.

A. $\boxed{4}\ \boxed{+}\ \boxed{4}\ \boxed{=}\ \boxed{=}\ \boxed{=}\ \boxed{=}\ \boxed{=}\ \boxed{=}\ \boxed{=}\ \boxed{=}\ \boxed{=}$ ➡ _____

B. $\boxed{4}\ \boxed{\times}\ \boxed{10}$ ➡ _____

★★★ 3. Princess Dianne counted the golden buttons on her 2 royal robes. One robe had 2 buttons. The other robe had 20 buttons. Her sister, Princess Joy, had 5 robes with 4 golden buttons on each robe. Which princess had more golden buttons?

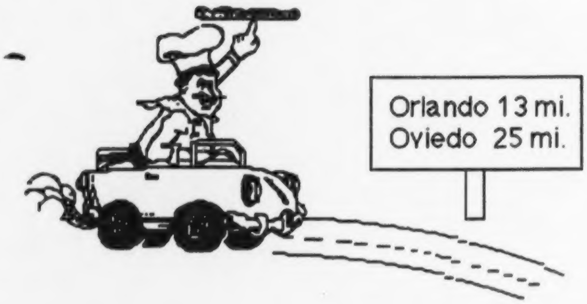
____________ How many more? _____

★★ 4. A movie begins at 11:00 a.m. and runs for one and a half hours. What time will the movie be over?

Answer: ________

★ 5. How many miles from Orlando to Oviedo?

Answer: ____ miles


Orlando 13 mi.
Oviedo 25 mi.

★★ 6. My name costs $13. Look at the letter prices. Is my name Jan, Meg, or Ann?

Letters: $3 each		
A	B	C
D	E	F
G	H	I
J	K	L

Letters: $5 each		
M	N	O
P	Q	R
S	T	U
V	W	X

Answer: __________

★ 7. Christmas Day – December 25th – came on Friday one year. How many Sundays were left in that year?

Answer: _______ Sunday(s)

★★★ 8. Write the standard numeral for these expanded numerals.

A. 70 + 6 + 300 = _____

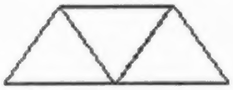
B. 4 + 500 = _____

C. 200 + 5 + 60 = _____

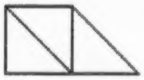
Commentary

Earth, XIX

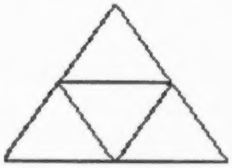
1. Several of the correct ways to divide the shapes are as follows:



A



B



C

2. **(A. 40 B. 40)** Problem (a) involves the repeated function concept on a calculator. Four is added repeatedly, every time $\boxed{=}$ is pushed. Problem (b) is used to show that multiplying by 10 is the same as adding a number – the number 4 from part (a) – ten times.

3. **(Princess Dianne , 2 more buttons)** Dianne had 20 + 2 = 22 buttons. Joy had 5 robes with 4 buttons each, which is 20 buttons. Students can find these numbers by drawing the figures and simply counting, if necessary.

4. **(12:30 p.m.)** 11:00 plus one and one-half hours gives 12:30 p.m.

5. **(12)** Students might want to draw a diagram to decide what a reasonable answer might be. Without such an aid, many will think that the numbers should be added. They might not understand what such a road sign means.

6. **(Ann)** A costs $3. Each N costs $5. $5 + $5 + $3 = $13. Students might enjoy finding out who has the most expensive name and the least expensive name in the class, using these charts.

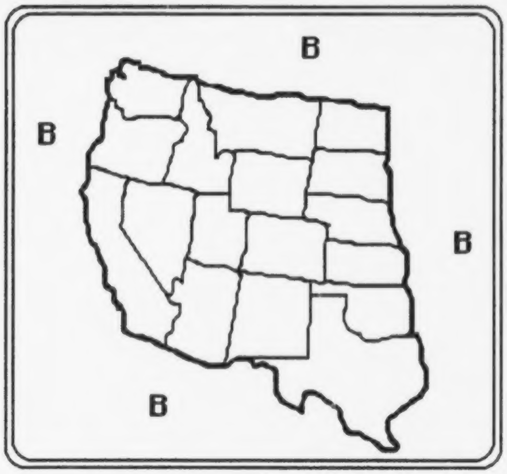
7. **(1)** Sunday the 27th is the last Sunday left in the year. Students will need to know that there are 31 days in December. They might begin by writing the days of the week with numbers under them, calendar-style, until they run out of days in December.

8. **(A. 376 B. 504 C. 265)** These problems are not difficult, except that the order in which they typically appear in textbooks – largest to smallest – has been scrambled. Therefore the student must first decide the order in which to put the numbers so that place value becomes obvious. Problem (b) might give difficulty since there are no 10s to consider, and some will not remember to record a 0 in the tens place of the answer.

SUNSHINE MATH
Earth, XX

*Name:*__________________________
(This shows my own thinking.)

★★★★ 1. Finish coloring the map using only 4 colors – blue, red, green, and yellow. No state can be the same color as a state which touches it along a line. No state that touches the outside can be blue.



Key:
B means blue
G means green
Y means yellow
R means red

★ 2. Put the correct sign (>, <, or =) in the box to make this number sentence true.

25 + 13 ☐ 18 + 17

★★★ 3. Answer the three riddles below.

a Double me and add 1 to get 13.
Who am I? ____

b Double me and add 5 to get 9.
Who am I? _____

c Double me and than take away 1 to get 9.
Who am I? ____

★★ 4. LaToya has 6 flower pots. She wants to plant 5 flowers in each pot. How many flowers does she need?

Answer: _____ flowers

★ 5. Write these numbers in order from smallest to largest. 289, 430, 521, 167, 305

Answer: _____, _____,______, _____, _____

★★ 6. Use the digits, 3, 8, and 2. Make six 3-digit numbers. Each digit may be used only one time in a number.

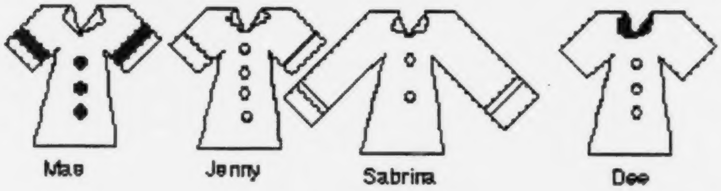
Answer: ____ ____ ____ ____ ____ ____

★★ 7. Ronnie is 6 years old. Chauncey is 3 years older than Ronnie. Quartasha is 2 years older than Chauncey. How old is Quartasha?

Answer: ________ years old

★★ 8. What's my name?

- ▲ My shirt has short sleeves.
- ▲ My shirt has 3 buttons.
- ▲ My shirt has stripes on the sleeves.

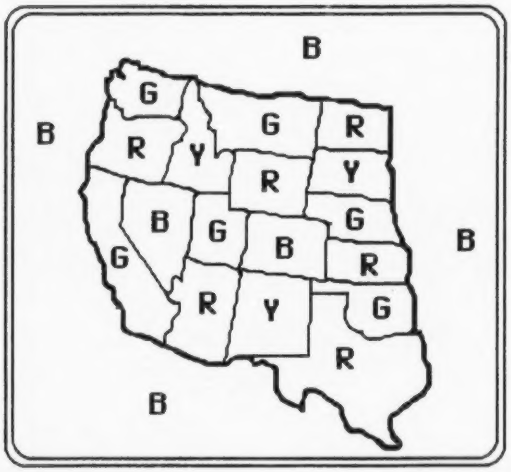


Answer : ____________

Commentary

Earth, XX.

1. **(To the right.)** This problem is the famous "four-color problem" from the ancient history of mathematics. For hundreds of years, mathematicians thought that any such map could be colored in four colors or less, but no one could prove it. The solution was finally reached in the mid-80s, but map-coloring exercises such as this one are still enjoyable for students and adults of all ages. One solution is given to the right:



2. (**>**) The number sentence is "38 is greater than 35."

3. **(a. 6; b. 2; c. 5)** Students might put the digits from 1 to 9 on index cards, and first try each riddle with a card pulled at random, then move to a higher or lower digit from the index-card pile if that guess didn't work. This would be a concrete introduction to the *guess-check-revise* strategy.

4. **(30)** The answer may be obtained by adding 5 six times. Students may want to draw a picture of the 6 flower pots, with 5 flowers in each, and simply count.

5. (**167, 289, 305, 430, 521)** This answer is found by place value. Since each number has a different value in the largest place, the hundreds, students need only to look at the hundreds place.

6. (**382, 328, 832, 823, 238, 283)** The numbers may be listed in any order. However, students should be encouraged to *organize* their work in such cases. For example, this list is organized by "make all the numbers you can with 3 as the first digit, then move to 8 as the first digit, then to 2 as the first digit, as the digits appeared in the problem."

7. **(11)** To solve this problem, all you have to do is add 3 years to Ronnie's age to get Chauncey's age, 9. Then add 2 years to Chauncey's age to get the age of Quartasha. Some students might want to simply hold out 6 fingers for Ronnie, add 3 more fingers for Chauncey, and then 2 for Quartasha, and count.

8. **(Mae)** The first clue eliminates Sabrina. The second clue eliminates Jenny. The third clue eliminates Dee. Therefore, by *process of elimination*, Mae is the answer. Notice that Mae fulfills all three conditions.

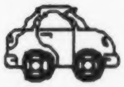
SUNSHINE MATH
Earth, XXI

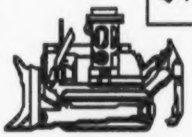
Name: ______________________________
(This shows my own thinking.)

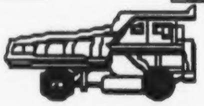
★★ 1. A plane left Atlanta to go to Orlando and then Miami. 186 people were on the plane when it left Atlanta. 5 people got off in Orlando but 20 people got on. How many people were on the plane when it got to Miami?

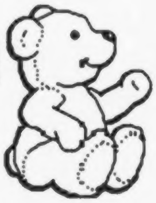
Answer: ________ people

★★★ 2. You have 1 dollar, 1 quarter, and 2 dimes. Circle the most expensive toy you can buy.









★★★ 3. Jason lined up 5 toy cars. He placed the blue car between the yellow car and the red car. He put the yellow car last. He placed the purple car behind the green car. Label the color of the cars below as Jason lined them up.

_____ _____ _____ _____ _____

★ 4. Mom had 25 cookies. She ate 2 cookies, Frederick ate 8, Andy ate 6, and Dad ate the rest. How many cookies did Dad eat?

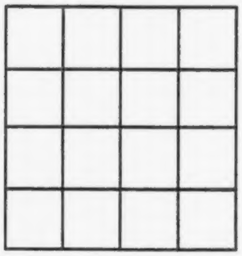
Answer: _____ cookies

★★★★ 5. Write the digits in the boxes below so the problems will be correct.

a. $\begin{array}{r} 2\square \\ +3\,5 \\ \hline 5\,7 \end{array}$ b. $\begin{array}{r} \square 7 \\ -4\,6 \\ \hline 2\,1 \end{array}$ c. $\begin{array}{r} 7\,3 \\ +1\square \\ \hline 9\,2 \end{array}$ d. $\begin{array}{r} 5\,6 \\ -\square 9 \\ \hline 2\square \end{array}$

★★★★ 6. How many squares are in this picture?

Answer: ____ squares

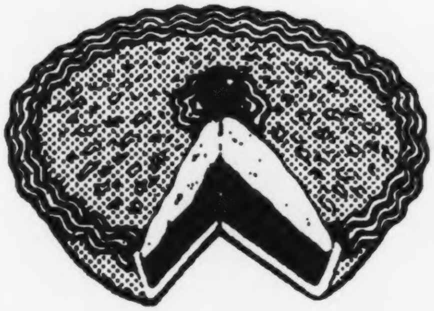


★★ 7. I am a capital letter made of 3 line segments. Two of my segments are equal and parallel. My third segment is shorter and intersects both parallel line segments. What letter am I?

Answer: ________

★★ 8. What fraction of this pie has already been eaten?

Answer: ☐ has been eaten.



Commentary

Earth, XXI

1. **(201 people)** Some students might not realize that a plane from Atlanta to Miami might make an intermediate stop in Orlando. A diagram might be helpful. The problem can be approached by either adding 186 and 20, then subtracting 5, or by subtracting 5 from 20, and adding that result to 186.

2. **(dumptruck)** The total of the money is $1.45, which is the cost of the dumptruck. The roadgrader is also less than $1.45 but it is not the most expensive.

3. **(yellow, blue, red, purple, green, from left to right)** The second clue (the yellow car last) gives you a place to start. Label the left-most car (the last car in line) as yellow. The first clue then tells you then blue is next-to-last, and red is in the middle of the 5. The third clue tells you that the green car must be first, followed by the purple.

4. **(9 cookies)** The most common way to solve this problem is to add all the cookies known to be eaten, then subtract from 25 to find what Dad ate. Students might also draw 25 cookies, mark out those they know were eaten, and count the ones left.

5. (a. 2; b. 6; c. 9; d. 2 and 7) These problems can be solved by working backwards from what you know. Parts (c) and (d) are more difficult as they involve regrouping.

6. **(30 squares)** Students should be encouraged to organize their search for these squares. Perhaps the easiest way to count all the small squares first, then move to the next smallest (2-by-2 squares), then the next smallest (3-by-3 squares) and then the largest (a 4-by-4 square). There are 16 small squares, 9 squares that are 2-by-2, 4 squares that are 3-by-3, and 1 square that is 4-by-4. That gives a total of 30 squares.

7. **(H)** H is the only letter that matches the attributes. I, N, and Z could all be considered if the student draws them with the middle segment shorter than the other two, but usually this is not the case.

8. **(Accept 1/6, 1/7, or 1/8)** This problem is unusual for students because the piece they are asked to consider is not shown. They will need to know to divide the pie into pieces the same size as the missing piece, and then count all the pieces that would make up the whole pie.

SUNSHINE MATH
Earth, XXII

*Name:*__________________________

(This shows my own thinking.)

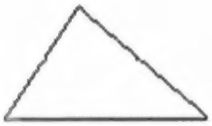
★★★ 1. The perimeter of a shape is the distance around it. A square has sides that are 18 centimeters long. What is the perimeter of the square? Use the space below to draw a picture if you wish.

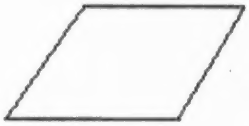
Answer: ________ centimeters

★★ 2. Saie and Munjori are reading. Saie read from the top of page 35 to the bottom of page 45. Munjori read 10 pages. Who read more pages?

Answer: ________

★★★★ 3. Divide each of these shapes into one triangle and one four-sided figure by drawing one line in each.





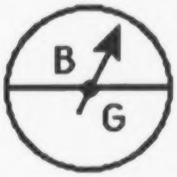
★★ 4. Mike wants to buy a pen that costs 39¢, a pad for 47¢, and an eraser for 22¢. He has a piggy bank full of quarters. How many of his quarters will he need to make his purchases?

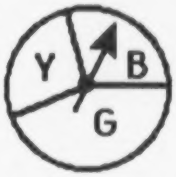
Answer: ________ quarters

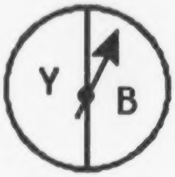
★★★ 5. The year 1881 is special because you can read it upside down or right side up. When was the last time there was a special year like that? Use a calculator to find this answer.

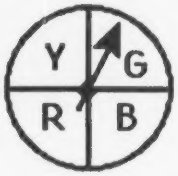
Answer: ________

★★★ 6. Circle the spinner with the best chance of landing on G.

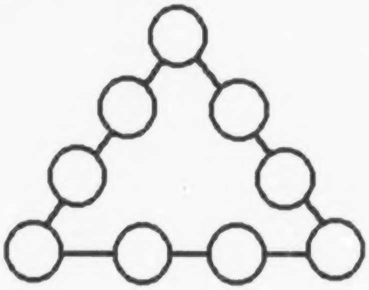




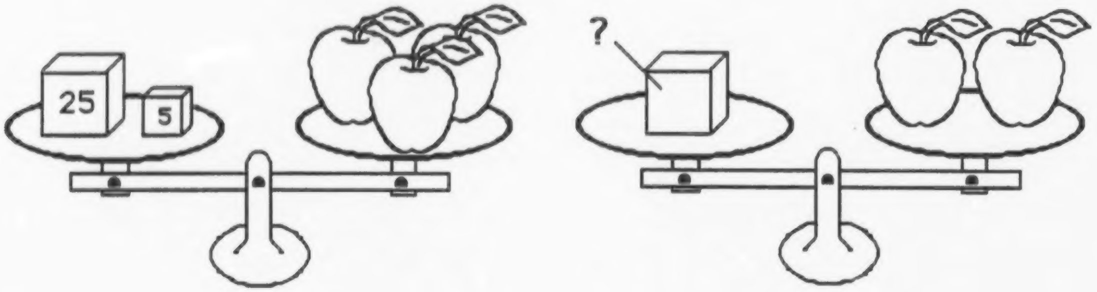




★★★★ 7. Place the digits 1 to 9 inside the circles so that the sum will be 17 along each side. Use each digit once.



★★★ 8. How much weight does it take to balance 2 apples? Write the weight inside the box below.



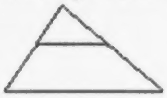
Commentary

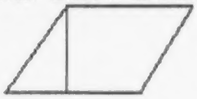
Earth, XXII

1. **(72)** This may be solved by repeated addition: 18 + 18 + 18 + 18 = 72. In later years, students will solve the problem by multiplication: 18 centimeters per side times 4 sides gives 72 centimeters.

2. **(Saie has read 1 page more.)** The student needs to first decide how many pages Saie has read. A student might select a book and physically go from the top of page 35 to the bottom of page 45. If so, the count will be 11 pages. Munjori has read only 10 pages.

3. There are several different ways the line can be drawn. Below is one solution for each figure.



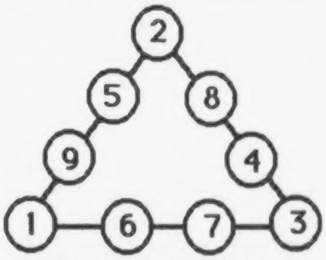


4. **(5 quarters)** His purchases total $1.08. He needs 5 quarters or $1.25 for his purchases.

5. **(1961)** You can turn the number on its head and you see the same number. It will be 6009 before this occurs again.

6. **(left-most spinner)** The probability of spinning a green is 1/2 on the left-hand spinner, and less than that on the other three. The probability of an event in this situation is related to the area of the shape labelled "G." The left-hand figure has the largest area for G. (Note: The third figure may cause concern for some students, as there is no area named G; therefore, there is no chance whatsoever of landing on G.

7. There are many solutions, but they all have in common that the smallest 3 numbers – 1, 2, and 3 – must be in the corners. It's also true that the three highest numbers – 7, 8, and 9 – must all be on different lines. These hints should help students who are having difficulty. One solution is:

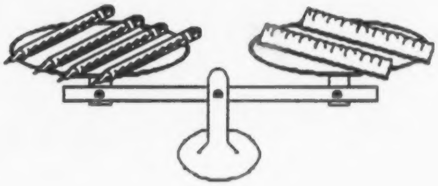


8. **(20)** The left-hand balance scale can be used to determine that each apple must weigh 10. Students will find this by guessing what each apple must weigh, and checking to see if 3 apples of that weight total 30. Once they have determined that each apple weighs 10, then the two apples on the right-hand scale must be balanced by a weight to 20.

SUNSHINE MATH
Earth, XXIII

Name: ____________________________
(This shows my own thinking.)

★★ 1. Which weighs more, the pencil or the ruler?



Answer: ________

★★ 2. A school lunch costs Tanya $1.25. About how much does she pay to eat at school for a whole week? Circle the best answer.

$3 $5 $4 $6

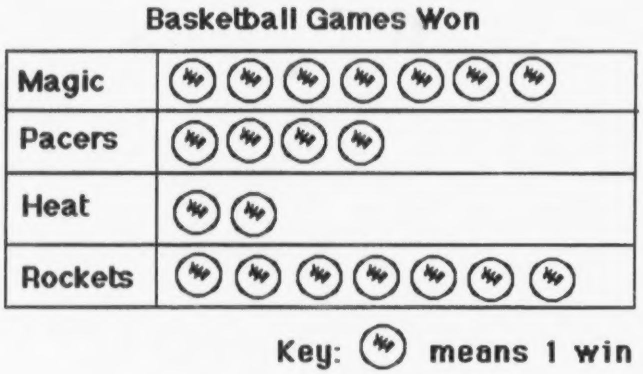
★ 3. A famous military building in Washington, D.C. is called the Pentagon because of its shape. On the 4th of July a flag is flown on each side of the building. How many flags are needed?

Answer : ________ flags

★ 4. Parker has 26 golf balls. She gives Bryan 19 golf balls. How many golf balls does Tanya have left?

Answer: ________ golf balls

★★★★ 5. Look at the graph of 20 games played. Answer the three questions below the graph.



A. How many more games did the Magic win than the Heat? _______ more games

B. Which team won exactly 2 games more than another team? __________

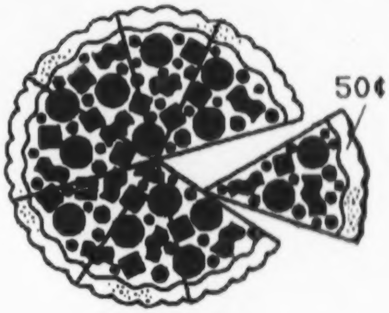
C. Fill in the chart so that each team has the same number of wins for those 20 games.

Basketball Games Won

Magic	
Pacers	
Heat	
Rockets	

★★ 6. One pizza slice costs 50¢. How much would the whole pizza cost?

Answer: _____



Commentary
Earth, XXIII

1. **(ruler)** Since 4 pencils balance 2 rulers, 2 pencils must weigh the same as 1 ruler. This means that the ruler is heavier than the pencil.

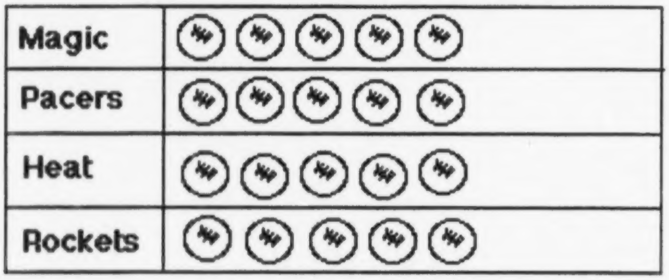
2. **($6)** Students can easily add $1.25 five times, if they think of this amount as a 1 dollar bill and a quarter. If they put five such amounts together, they have five 1 dollar bills and 5 quarters, for $5 plus $1 from 4 quarters, plus $0.25 from the left-over quarter. This amounts to $6.25, or a little over $6.

3. **(5)** A pentagon has 5 sides so you would need 5 flags. The purpose of the problem is for students to recognize that geometry words appear in the real world also.

4. **(7)** This is a simple subtraction problem. Some students may want to draw 26 circles for the golf balls she has, then mark out 19, and count the circles left.

5. **(A. 5; B. Pacers; C. See chart below)**

Basketball Games Won



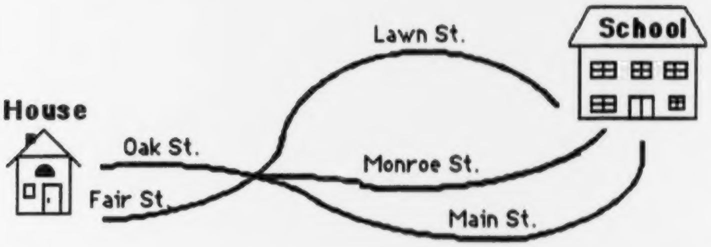
Part (C) above is an intuitive introduction to the concept of an *average*.

6. **($4)** Students will probably put 2 slices together to total $1, and then count by 2s till they get to 8 slices. Some students might add $0.50 eight times.

SUNSHINE MATH
Earth, XXIV

*Name:*________________________
(This shows my own thinking.)

★★★ 1. How many different ways can Marcus get from his house to school? (HINT: Make a list, starting with *Oak Street, Main Street.*)


House
School
Lawn St.
Oak St.
Fair St.
Monroe St.
Main St.

Answer: ________ ways

★★★ 2. Do these problems on your calculator:

A.) 46 + 54 + 80 + 209 = _____

B.) 289 + 303 − 578 = _____

C.) 375
68
+396 = _____

★ 3. A gerbil costs $4.86. Charlie has 4 one-dollar bills, 1 quarter, 3 dimes, and 6 nickels. Does Charlie have enough money to buy a gerbil?

Answer: ________

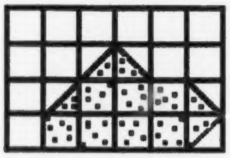
★ 4. Tamika found 25¢ at the beach. She also found 36¢ on a walk in the park and another 48¢ in a purse in her toy box. How much money does she have in all?

Answer : _________

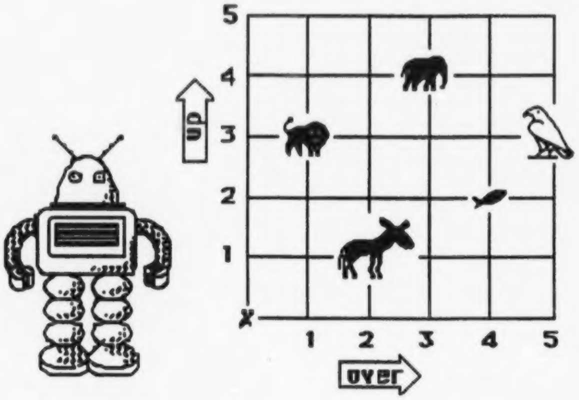
★ 5. Write or rewrite the money value in problem 4 with a dollar ($) sign.

Answer: _________

★★★ 6. Find the area of the dotted figure.
Answer: _________ square units



★★★★ 7. Help the robot find his way at the zoo. Tell him how many steps *over*, and how many steps *up*, to find an animal. The robot always starts at ✗.



The first is done for you in the chart.

To find the:	Go *over*:	Go *up*:
donkey	2	1
lion		
elephant		
fish		
bird		

Commentary

Earth, XXIV

1. **(6)** The students might make an organized list of the ways:
   Oak Street and Main Street
   Oak Street and Monroe Street
   Oak Street and Lawn Street
   Fair Street and Main Street
   Fair Street and Monroe Street
   Fair Street and Lawn Street

2. **(A. 389; B. 14; C. 839)**

3. **(No)** Charlie has $4.85 and the gerbil costs $4.86. Charlie is a penny short.

4. **(109¢ or $1.09)** Accept either answer.

5. **($1.09)** Give the students who use the $ notation in problem 4 credit for this problem also.

6. **($9\frac{1}{2}$)** This problem may be solved by counting the number of whole units, then putting together half units to make a whole unit, and counting the half that is left. There are 7 whole units, 2 more whole units by putting together half units, and a half unit left by itself. Some students might know how many there are, but be unfamiliar with writing a mixed number and write it out in words.

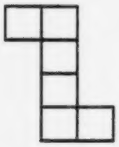
7. **(lion: 1, 3; elephant: 3, 4; fish: 4, 2; bird: 5, 3)** The problem introduces the cartesian coordinate system. Students might want to trace the path to each animal with their fingers. By convention, the horizontal distance is always given first, followed by the vertical distance.

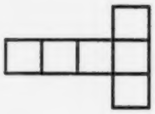
SUNSHINE MATH *Name:*__________________________
Earth, XXV *(This shows my own thinking.)*

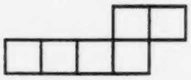
★ 1. Sharon has 4 baseballs and 6 softballs. She also has 8 bats. Does she have more bats or more balls? How many more?

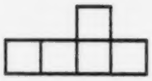
Answer: She has ___ more ______ than ____.

★★★★ 2. Circle the drawings that fold and make a cube.









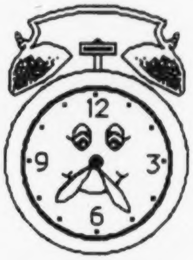
★★★ 3. Jon is at the County Fair. He wants to go for rides on the ferris wheel. Today he can ride 5 minutes for 3 tickets. He has 18 tickets left. How many minutes in all can Jon ride on the ferris wheel?

Answer: ________ minutes

★★ 4. Susie scored 37 points in her first bowling game. She scored 20 points more in her second game than she did in her first. What was her total score for both games?

Answer: ________ points

★★ 5. Markus has to be at school at 8:00. The time he leaves his house is shown on the clock. How long does he have to get to school?

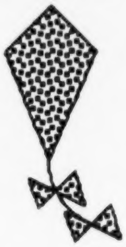
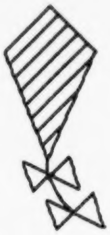
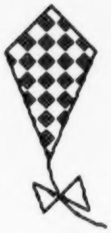
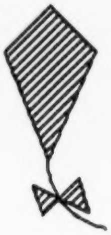
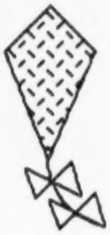


Answer : _______minutes

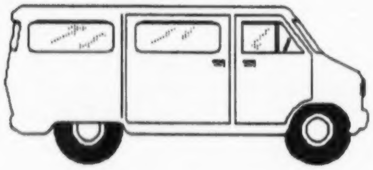
★★ 6. Kim needs 10 inches of ribbon to make a bookmark. A spool of ribbon has 86 inches. Can Kim make a bookmark for each of her 9 friends from one spool of ribbon?

Answer: ________

★ 7. Circle the kite that belongs to Tom. It has a tail with two bows. The bows do not match the pattern on the kite. The pattern on the kite rhymes with "yipes."

★★★ 8. Parents with vans were taking Mr. Axel's class to the zoo. The class has 31 students. If each van holds 7 students, how many vans were needed?



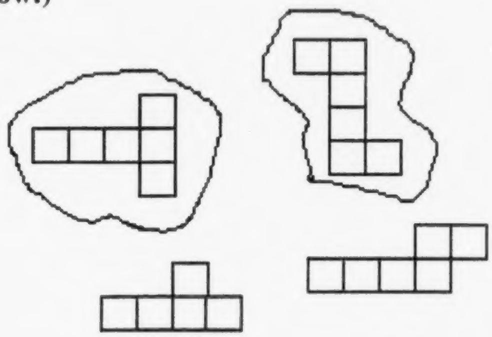
Answer: ____ vans

Commentary

Earth, XXV

1. **(2, balls, bats)** Students will probably add 4 and 6 to get 10 balls and compare this to 8 bats.

2. **(solutions shown below.)**



3. **(30 minutes)** This multi-step problem is a good activity to be acted out. Students can take 18 tickets and separate them into 6 sets of 3. Then students can find the answer by adding 5 minutes 6 times. 5 + 5 + 5 + 5 + 5 + 5 = 30 minutes. This type problem will later be solved by multiplication: 6 × 5 minutes = 30 minutes.

4. **(94)** To find the score of Susie's second game, the student needs to add 20 points to the score of her first game. Then these two scores – 37 and 57 – are added.

5. **(35)** The clock shows 7:25. Students can count by 5s from 7:25 up to 8:00 o'clock and have 35 minutes. Some students might simply add 5 minutes to the half-hour they see from 7:30 to 8:00, arriving at 35 minutes more efficiently.

6. **(No)** Students may determine the amount of ribbon needed by counting by 10s: 10, 20, 30, 40, 50, 60, 70, 80, 90. Ninety inches are needed, but a spool only has.86 inches. So the answer is "no."

7. **(Second from left)** The first clue eliminates the 3rd and 4th kites from the left. The second clue eliminates the first kite. The last clue tells you the pattern might be "stripes" since that word rhymes with "yipes." Notice that the first and third clues, taken together, are also enough to determine the kite.

8. **(5)** Later this problem will be solved by dividing 31 by 7 and getting 4 r. 3, telling you that 4 vans are not enough. Therefore 5 are required. At this point, students might solve the problem by drawing 31 stick figures for the students in class and grouping them in sets of 7 for each van. Three students will be left ungrouped and need a fifth van.